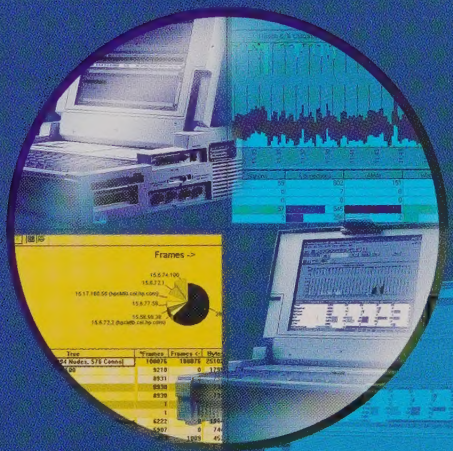
Internet Advisor



Internet Advisor WAN

Getting Started

Agilent Technologies

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Agilent Technologies

Internet Advisor WAN

Getting Started

Agilent Technologies

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Printing history New editions of this guide are issued to reflect extensive changes made to the software. Revisions may be issued, between editions, to correct errors in the manual. There may not be a new edition issued in conjunction with every software release. The software release, at the date of printing, is noted in the following table.

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Manual Name: Agilent Technologies Internet Advisor WAN Getting Started

Part Number	Printing Date	Software Version
5967-4336	August 1998	9.8
5969-2260	July 1999	11.000.01
5969-2299	September 1999	11.100.00
5969-6026	March 2000	11.300.00

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Printed in the U.S.A.

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Introduction

Introduction

The Agilent Technologies Internet Advisor WAN is a powerful protocol analyzer designed to help you troubleshoot and analyze your network.

It consists of a ruggedized personal computer equipped with modular data acquisition and transmission hardware, as well as powerful Microsoft® Windows® based network analysis software. Standard peripherals such as serial/parallel ports, floppy drive, pc card slot, etc. are also included.

You can use the Internet Advisor WAN to:

- resolve network problems quickly and effectively
- prevent network problems before they affect users
- optimize network performance

The Internet Advisor WAN analyzes the following protocols:

- Frame Relay
- X.25
- Bit Oriented Protocols such as HDLC, SDLC, etc.
- Point to Point Protocol (PPP) and Multilink PPP
- ISDN D and B channels
- ATM DXI
- LAPV (V5.1 and V5.2)

The Internet Advisor WAN supports the following physical interfaces:

- Built-in V-Series (RS-232, RS-449, V.35)
- T1
- DS3 (T3)
- CEPT-E1
- DDS 4-wire
- ISDN BRI S/T and U (for PRI use T1 or E1)
- High Speed Serial Interface (HSSI).

The Internet Advisor WAN gives you the tools to:

- Analyze the physical medium and physical layer protocol.
- See utilization and error statistics, filter and count specific frames and traffic types, and perform channel-specific statistical analysis.
- Identify the top users of the WAN bandwidth.
- Decode network traffic.
- Run simulation, traffic generation, and BERT measurements.
- Perform post-process analysis on captured traffic and statistics.

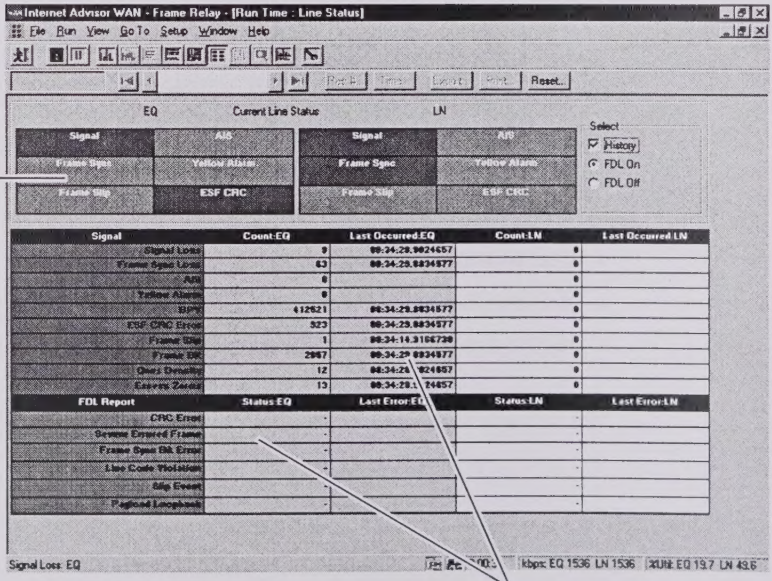
NOTE Not all capabilities are available for all protocols and physical interfaces.

The rest of this chapter describes in more detail the features provided by the Internet Advisor WAN. To learn how to get started, go to chapter 2. To see how to use the Advisor, go to chapter 3. To get detailed operating instructions, user interface descriptions, and other information, go to the online help.

Examining the Physical Layer

See signal, error, and alarm status of the physical line.

You can verify signal presence and frame synchronization, display error and alarm statistics, and see a statistical history of the status of the line collected since the start of the measurement. The Internet Advisor WAN's Line Status view provides this information for T1, DS3, E1, DDS 4-wire, BRI U, and HSSI when the appropriate interface module is installed.



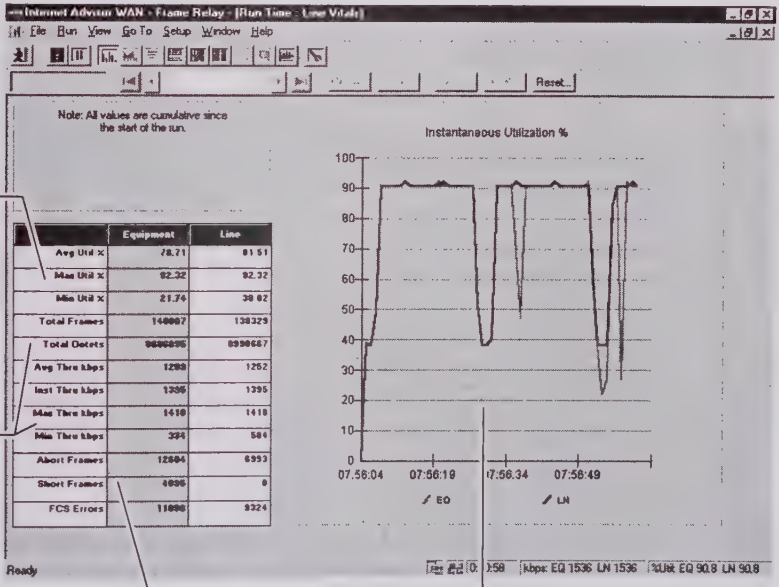
Use the on-screen 'soft' LEDs to see the status of physical layer transmission.

Use the spreadsheet to show a statistical history of the errors, alarms, and data events occurring on the link.

Examining Overall Utilization and Errors

See utilization, throughput, and error statistics.

To get a high-level view of the throughput, utilization, and error conditions at the point on the network where you are connected, you can look at the Line Vitals view. The Internet Advisor WAN provides this information regardless of physical interface or protocol.



Look at utilization values.

Look at frame and octet counts, and overall throughput.

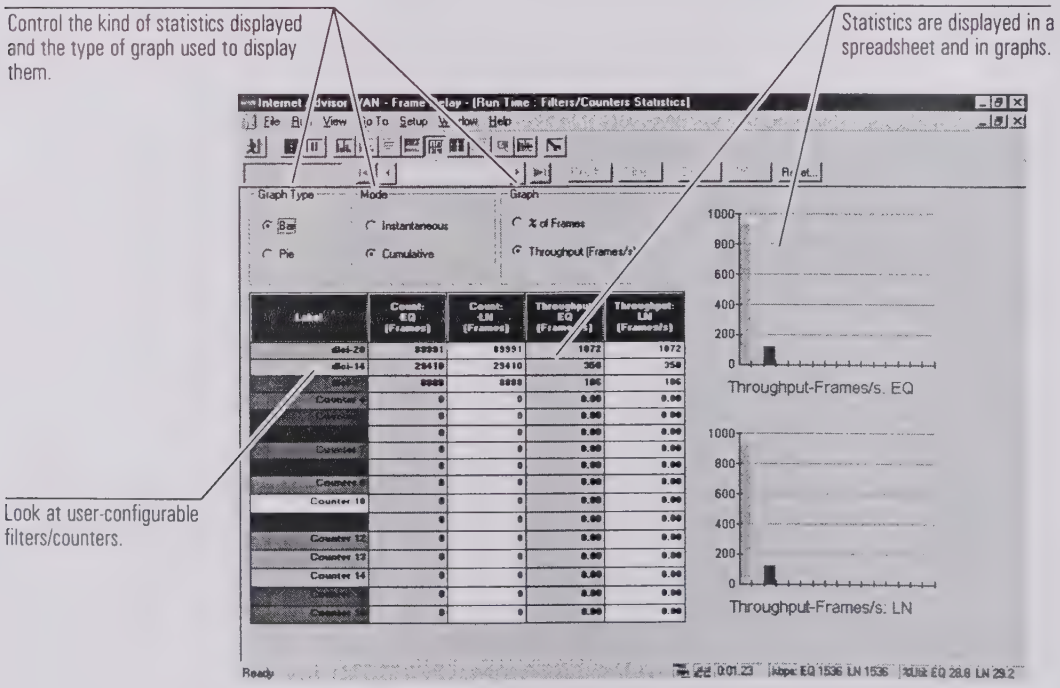
See counts of transmission errors.

Look at instantaneous utilization displayed graphically.

Filtering/Counting Specific Frames and Traffic

Display statistics gathered by user-configurable filters and counters.

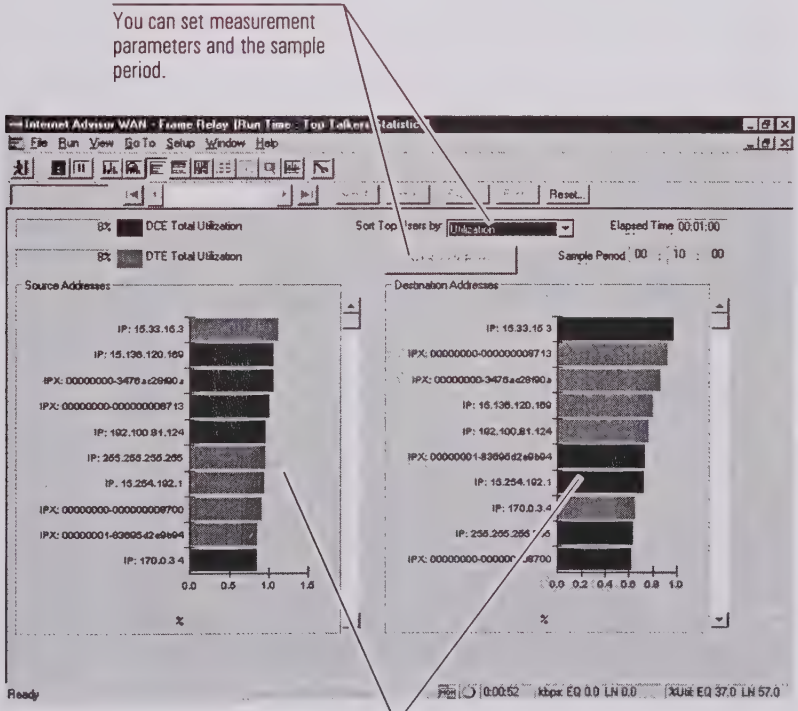
You can monitor very specific frames and traffic types by using the Filters/Counters Statistics view which displays statistics according to user-configurable hardware filters and counters. You can see instantaneous and cumulative statistical data for both the Line and Equipment sides of the test connection.



Determining Who's Using the Bandwidth

See which IP or IPX users are using the most WAN bandwidth.

It is often very useful to know which users, or groups of users, are using the most bandwidth on the WAN. The Top Talkers Statistics view provides you with utilization and throughput statistics associated with individual IP or IPX addresses. This measurement view sorts this data by showing which addresses are sending and which are receiving.

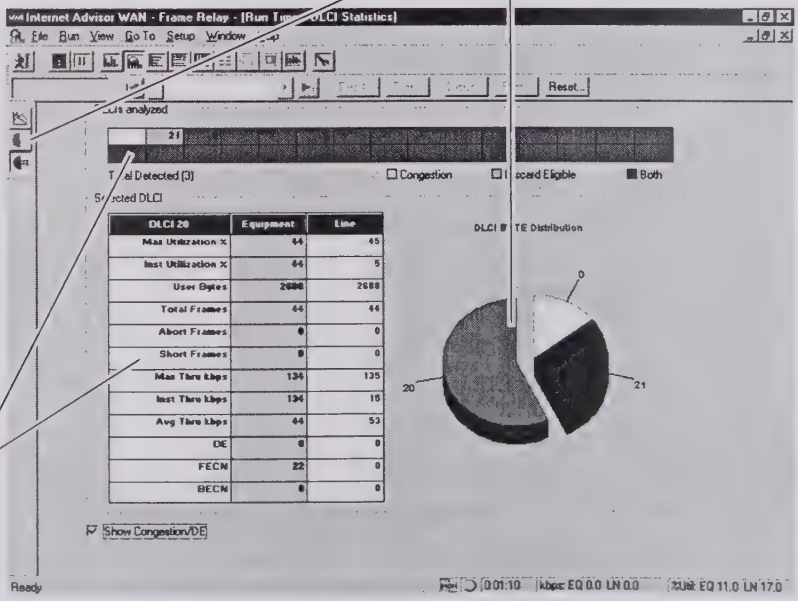


Analyzing Traffic According to WAN Channel

See statistics for individual Frame Relay DLCIs, X.25 LCNs, or ISDN B-channels.

For Frame Relay, X.25, or ISDN traffic, you can analyze network traffic and statistics associated with specific Data Link Connection Identifiers (DLCI), Logical Channel Numbers (LCN), or B-channels respectively. You can also get a strong sense of overall network activity according to WAN channel.

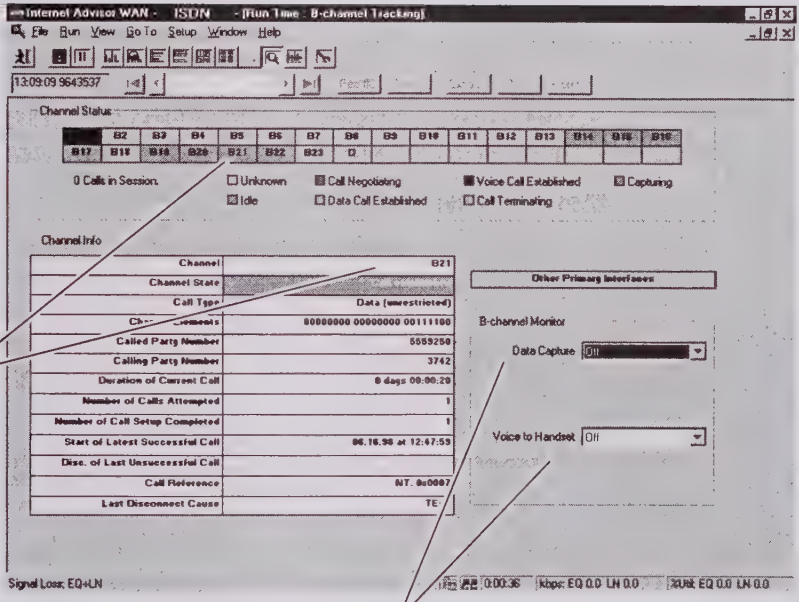
The DLCI Statistics view is used for Frame Relay traffic.



NOTE

Similar to the view above, the LCN Statistics view provides statistical information for LCNs on an X.25 network.

The B-channel Tracking view gives you an overview of call activity on ISDN interfaces.


Internet Advisor WAN - ISDN - [Run Time : B-channel Tracking]
File Run View GoTo Setup Window Help
13:09:09 9643537
Channel Status
B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16
B17 B18 B19 B20 B21 B22 B23 D
0 Calls in Session.
Unknown
Call Negotiating
Voice Call Established
Capturing
Idle
Data Call Established
Call Terminating
Channel Info
Channel B21
Channel State
Call Type Data (unrestricted)
Called Party Number 5559250
Calling Party Number 3742
Duration of Current Call 0 days 00:00:20
Number of Calls Attempted 1
Number of Call Setup Completed 1
Start of Latest Successful Call 06.16.98 at 12:47:55
Disc. of Last Unsuccessful Call
Call Reference NT. 0x0007
Last Disconnect Cause TE
Other Primary Interfaces
B-channel Monitor
Data Capture Off
Voice to Handset Off
Signal Loss: EQ+LN
0:00:36
kbps: EQ 0.0 LN 0.0
%Util: EQ 0.0 LN 0.0

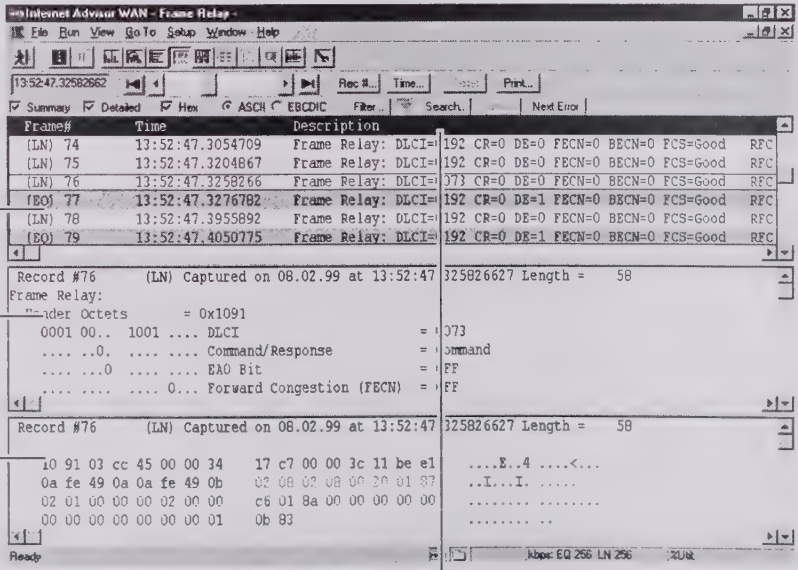
Choose the B-channel for which statistics are to be displayed in the spreadsheet.

Control which B-channels are analyzed and how the data is to be captured.

Decoding Network Traffic

Display the content of the monitored bit stream in a format you can easily read.

To get very detailed information about the traffic on the network, you can decode the bit stream into numbers, text, and symbols, and display it in the Decode view. You can also filter the display according to protocol or frame characteristics, and you can search the capture buffer for specific frames.


Internet Advisor WAN - Frame Relay
File Run View GoTo Setup Window Help
Summary Detailed Hex ASCII EBCDIC Filter... Search... Next Error
Frame# Time Description
(LN) 74 13:52:47.3054709 Frame Relay: DLCI=192 CR=0 DE=0 FECN=0 BECN=0 FCS=Good RFC
(LN) 75 13:52:47.3204867 Frame Relay: DLCI=192 CR=0 DE=0 FECN=0 BECN=0 FCS=Good RFC
(LN) 76 13:52:47.3258266 Frame Relay: DLCI=973 CR=0 DE=0 FECN=0 BECN=0 FCS=Good RFC
(EO) 77 13:52:47.3276782 Frame Relay: DLCI=192 CR=0 DE=1 FECN=0 BECN=0 FCS=Good RFC
(LN) 78 13:52:47.3955892 Frame Relay: DLCI=192 CR=0 DE=0 FECN=0 BECN=0 FCS=Good RFC
(EO) 79 13:52:47.4050775 Frame Relay: DLCI=192 CR=0 DE=1 FECN=0 BECN=0 FCS=Good RFC
Record #76 (LN) Captured on 08.02.99 at 13:52:47 325826627 Length = 58
Frame Relay:
Header Octets = 0x1091
0001 00.. 1001 .... DLCI = 973
.... ..0. .... Command/Response = Command
....0 .... EA0 Bit = FF
.... 0... Forward Congestion (FECN) = FF
Record #76 (LN) Captured on 08.02.99 at 13:52:47 325826627 Length = 58
10 91 03 cc 45 00 00 34 17 c7 00 00 3c 11 be e1 ....E..4 ....<...
0a fe 49 0a 0a fe 49 0b 02 08 02 08 00 20 01 87 ..I...I. .....
02 01 00 00 00 02 00 00 c6 01 8a 00 00 00 00 00 ....
00 00 00 00 00 00 00 01 0b 83 ....
Ready
kbps: EQ 256 LN 256

The Summary view shows a summary line for each decoded frame.

The Detail view shows the contents of each field in the decoded frame.

The Hex view shows the actual bytes in the decoded frame. The right column shows the contents in ASCII or EBCDIC.

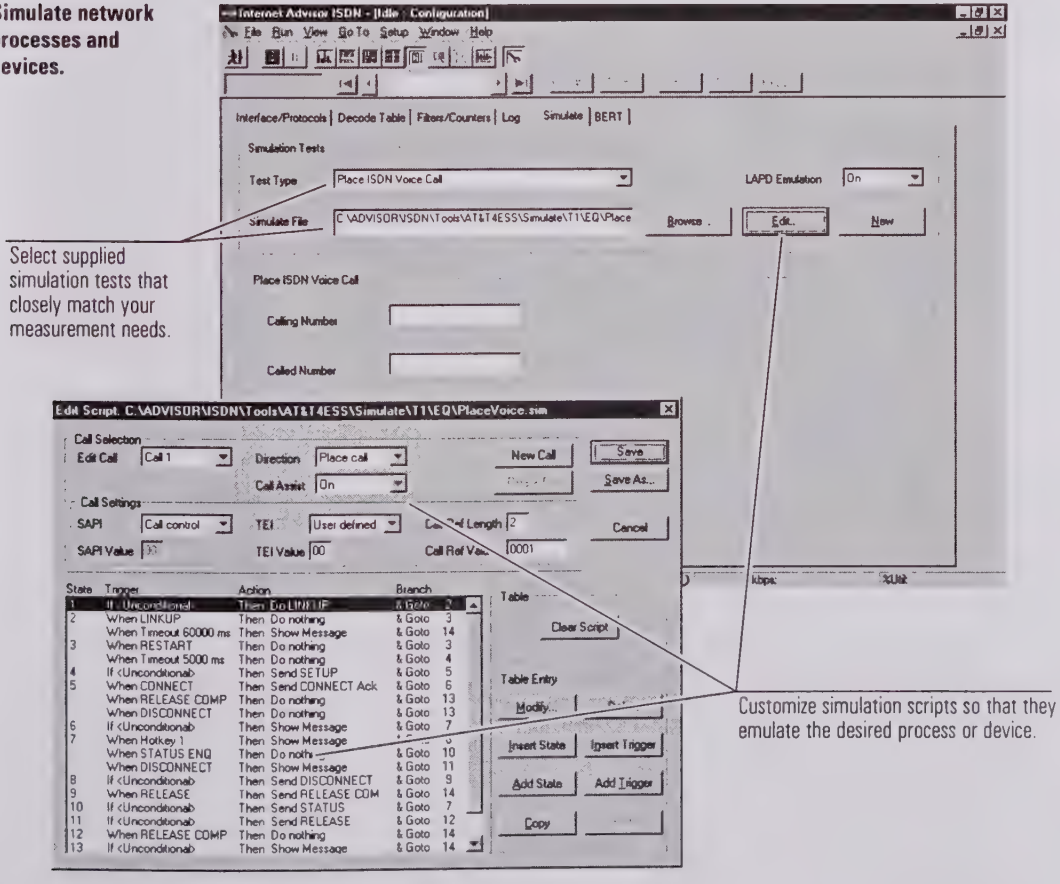
You can filter what is displayed in this view, and you can search the capture buffer for specific frames or data events.

Running Simulation, Traffic Generation, and BERT

Active tests provide additional information about your network.

In addition to passive monitoring, you can also perform tests of a more active nature. You can set up the Internet Advisor WAN to simulate network devices or processes, to generate specialized traffic patterns, and to perform bit error rate tests (BERT).

Simulate network processes and devices.

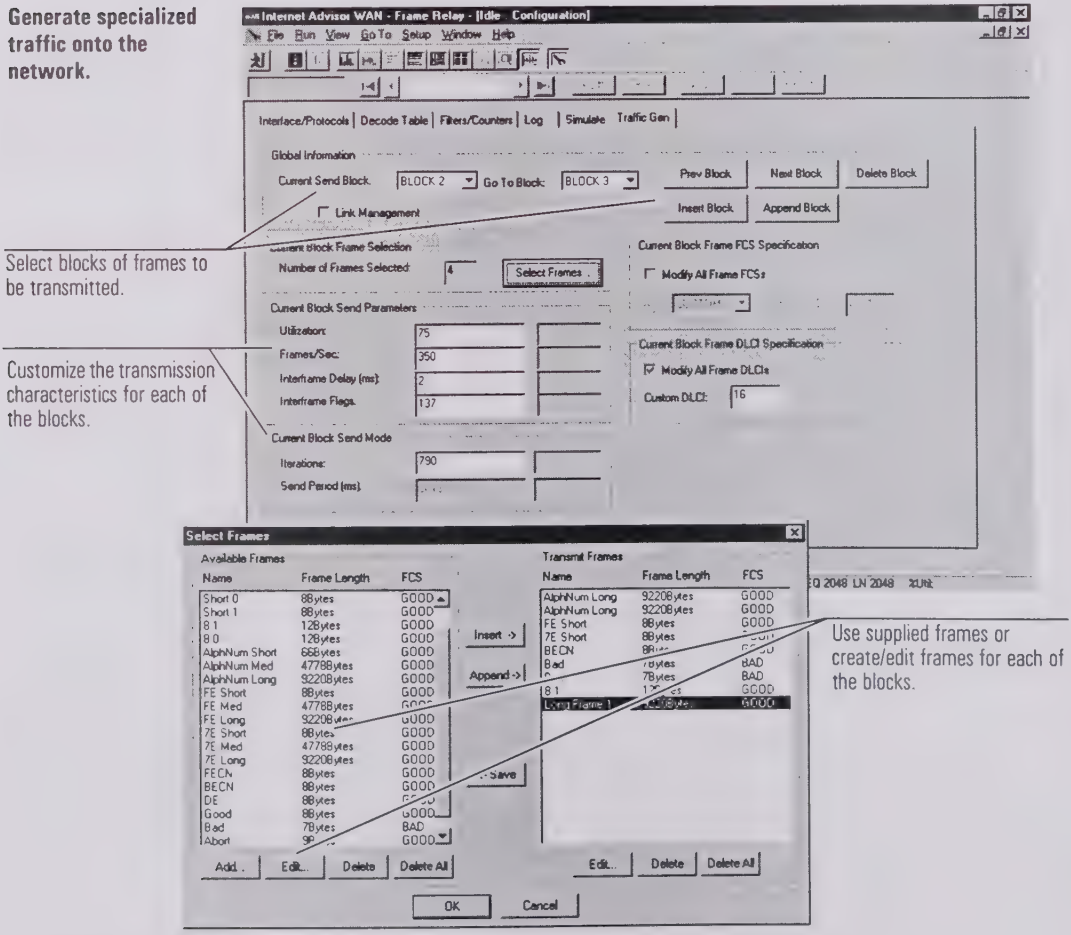

Internet Advisor ISDN - [Idle : Configuration]
File Run View Go To Setup Window Help
Interface/Protocols | Decode Table | Filters/Counters | Log | Simulate | BERT |
Simulation Tests
Test Type
Place ISDN Voice Call
LAPD Emulation
On
Simulate File
C:\ADVISOR\ISDN\Tools\AT&T4ESS\Simulate\T1\EQ\Place
Browse...
Edit...
New
Place ISDN Voice Call
Calling Number
Called Number
Edit Script. C:\ADVISOR\ISDN\Tools\AT&T4ESS\Simulate\T1\EQ\PlaceVoice.sim
Call Selection
Edit Call
Call 1
Direction
Place call
Call Assist
On
New Call
Save
Save As...
Cancel
Call Settings
SAPI
Call control
TEI
User defined
SAPI Value
TEI Value
00
Call Ref Val...
0001
State Trigger Action Branch
1 If <Unconditional> Then Do LINKUP & Goto 2
2 When LINKUP Then Do nothing & Goto 3
When Timeout 60000 ms Then Show Message & Goto 14
3 When RESTART Then Do nothing & Goto 3
When Timeout 5000 ms Then Do nothing & Goto 4
4 If <Unconditional> Then Send SETUP & Goto 5
5 When CONNECT Then Send CONNECT Ack & Goto 6
When RELEASE COMP Then Do nothing & Goto 13
When DISCONNECT Then Do nothing & Goto 13
6 If <Unconditional> Then Show Message & Goto 7
7 When Hotkey 1 Then Show Message
When STATUS ENQ Then Do nothing & Goto 10
When DISCONNECT Then Show Message & Goto 11
8 If <Unconditional> Then Send DISCONNECT & Goto 9
9 When RELEASE Then Send RELEASE COM & Goto 14
10 If <Unconditional> Then Send STATUS & Goto 7
11 If <Unconditional> Then Send RELEASE & Goto 12
12 When RELEASE COMP Then Do nothing & Goto 14
13 If <Unconditional> Then Show Message & Goto 14
Table
Clear Script
Table Entry
Modify...
Insert State
Insert Trigger
Add State
Add Trigger
Copy
kbps
%Util

Select supplied simulation tests that closely match your measurement needs.

Customize simulation scripts so that they emulate the desired process or device.

The results of Simulation tests are shown in both the Simulation Results view and the Advisor's other measurement views as well.

Generate specialized traffic onto the network.



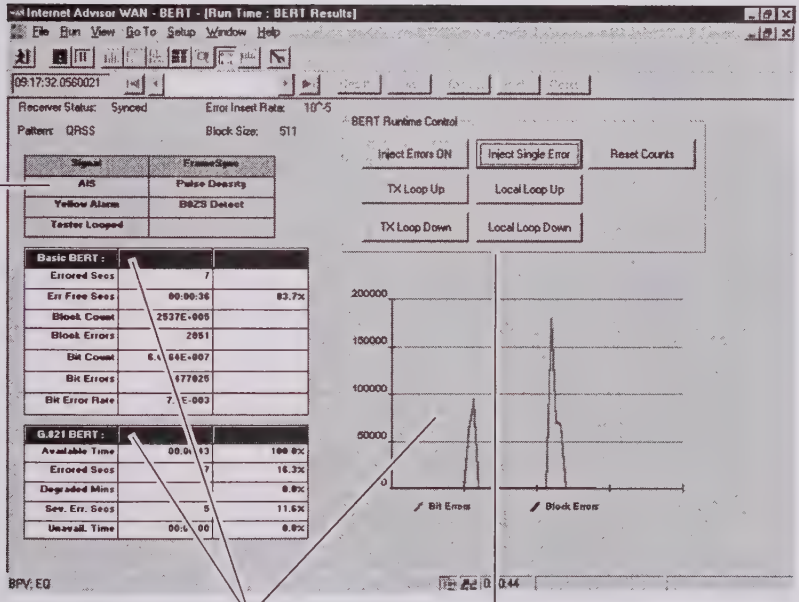
Select blocks of frames to be transmitted.

Customize the transmission characteristics for each of the blocks.

Use supplied frames or create/edit frames for each of the blocks.

Like simulation, the results of Traffic Generation tests can be displayed in each of the Advisor's measurement views.

Test the transmission quality of the physical layer with BERT.



For some interfaces, the line status is displayed via on-screen LEDs.

Various kinds of BERT statistics are displayed both in a spreadsheet and graphical format.

You can control aspects of the bit error rate test during run-time.

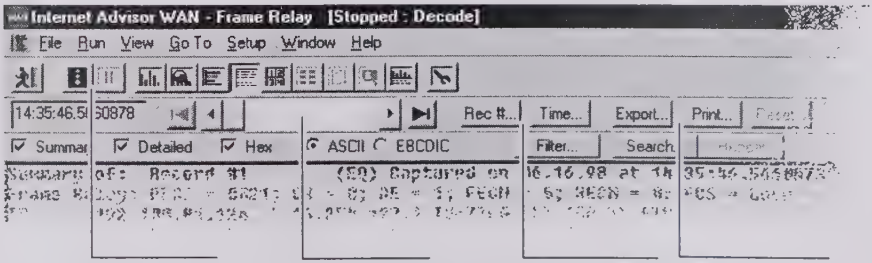
The Internet Advisor WAN provides a large number of common BERT patterns. You can also create and save your own customized BERT patterns.

Analyzing Post-Process Data

Capture (and save) network traffic and statistics for later analysis.

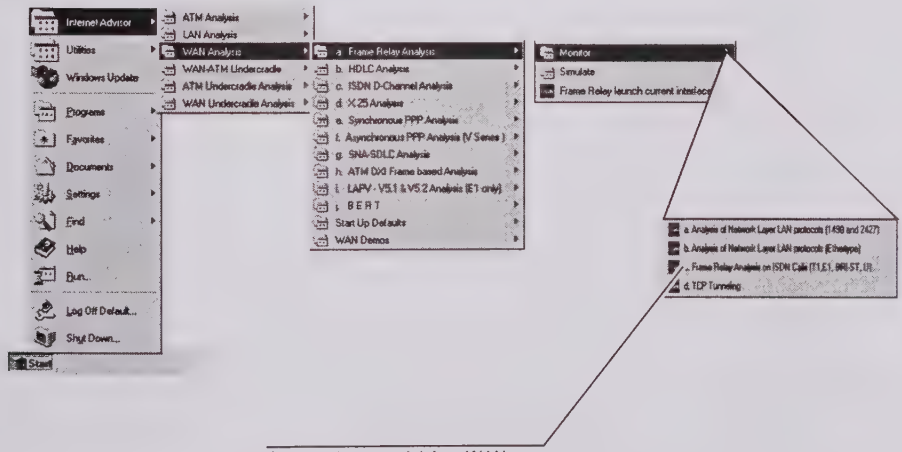
You can look at network traffic and statistics *after* you have captured it from a live network. This data can be accessed from the Internet Advisor's capture buffer or from a data file, and you can manipulate the data in a number of ways.

When the Internet Advisor WAN is monitoring, frame data is being cycled through a relatively large circular buffer (unless you configure it to do otherwise). Other statistical data is held in smaller memory caches. You can use the Advisor's measurement views to see the contents of this buffer and these caches by stopping the run (ending data capture) or by "freezing" the run (the display is paused but data capture continues). You can also save captured data to a file.



Supplied Tests

To make it easier to configure, the Internet Advisor WAN comes equipped with supplied tests. Supplied tests, or "canned tests" as they are sometimes called, are listings in the Internet Advisor cascaded menus (in the Windows desktop) that automatically set up the Advisor for common test situations and then start the appropriate application. Supplied tests set up the physical interface, decode characteristics, hardware filters/counters, and other analysis parameters so you don't have to.



Start an Internet Advisor WAN application by selecting the test that most closely matches your measurement needs.

For most test situations, you will have to fine-tune the configuration provided by the supplied test.

2

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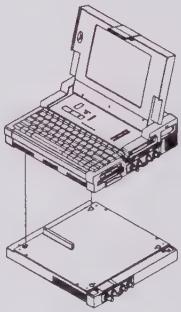
Getting Started

Getting Started

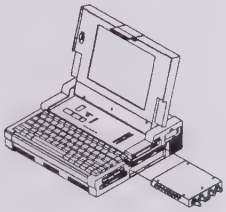
This chapter describes the steps you use to start testing with the Internet Advisor WAN.

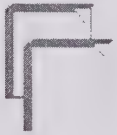
There are some steps you perform each time you start testing your network. Other steps you do only one time or just check that a step you performed previously is still valid.

① **Install the undercradle and slide-in module you plan to use. Install software if necessary.**



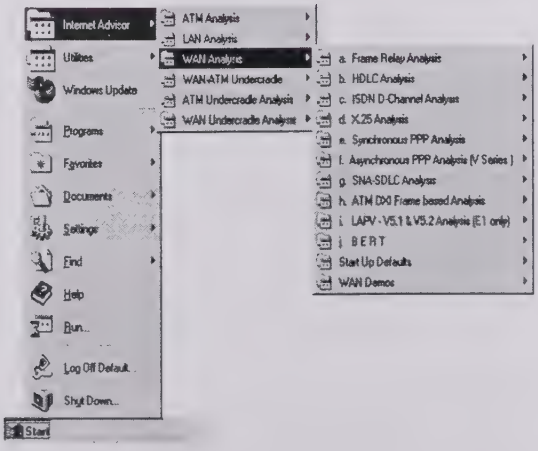
or





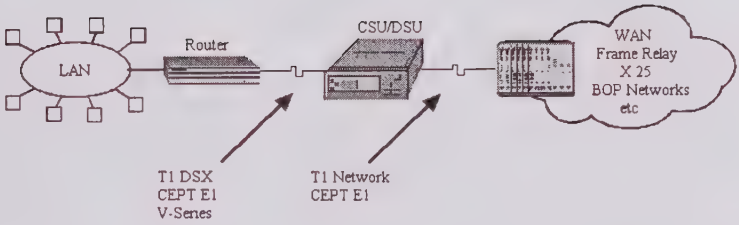
Use the Systems Guide to connect the mainframe, undercradle, and slide-in modules.
Use the CD-ROM Software Installation Guide to install or add software.

② **Start an Internet Advisor WAN application using one of the supplied tests.**

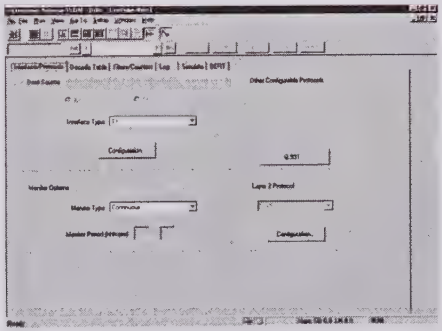


③ Connect to the network.

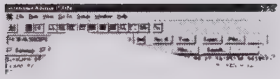
Illustration shows common connection points.

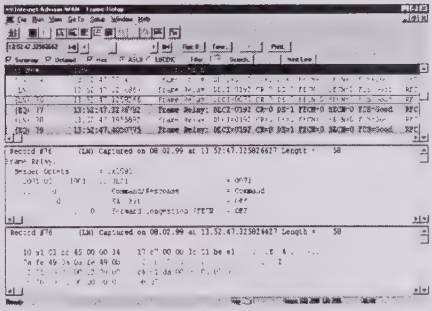


④ Fine-tune the configuration provided by the supplied test if necessary.



⑤ Start the test and view results in any of the measurement views.





Installing Undercradles, Interface Modules, and Software

Undercradle and Interface Module installation

Depending on the options you have purchased, you may have to install an interface module or undercradle for the specific physical interface you intend to connect to. If these items are not already connected to your Advisor, refer to the *Mainframe Features Systems Guide* for instructions.

CAUTION

To avoid damage to your hardware, be sure the Internet Advisor power switch is set to Off before removing or installing undercradles or interface modules.

Software Installation

New Internet Advisors are shipped with their application software installed on the hard drive. However, software upgrades may require that you install new Internet Advisor WAN applications, new versions of Windows, or both.

To install the Internet Advisor WAN software, first remove any attached undercradle and then use the installation instructions on the CD cover.

If you are installing other applications, follow the instructions provided with that software.

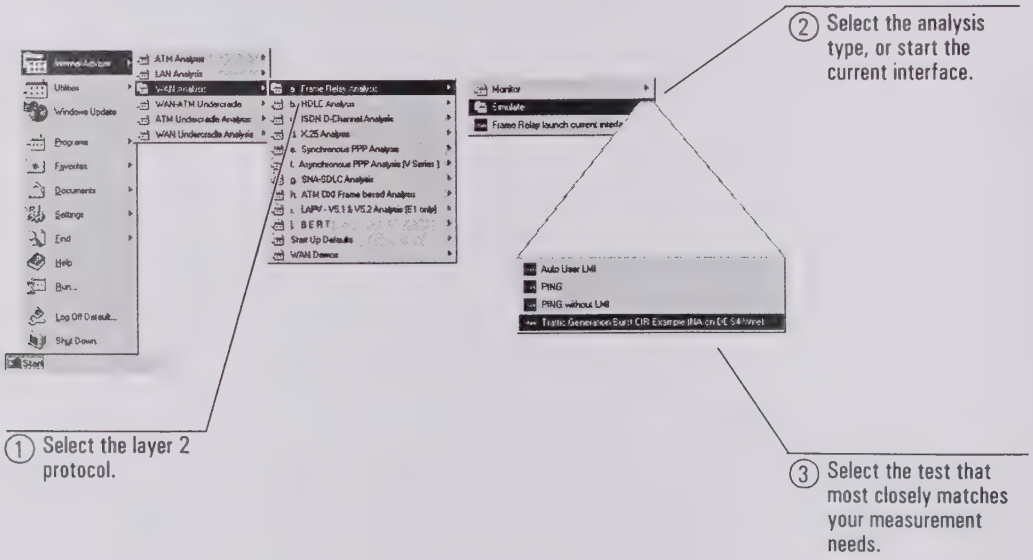
CAUTION

Be sure to save any measurement and configuration files you have created to a floppy disk before installing new Internet Advisor WAN software.

Starting the Application

Start and configure the Internet Advisor WAN using a supplied test

To start an Internet Advisor WAN application, select a supplied test from the Start menus in the Windows desktop. Supplied tests start and configure the Internet Advisor for specific groups of measurement.


2 Select the analysis type, or start the current interface.
1 Select the layer 2 protocol.
3 Select the test that most closely matches your measurement needs.

Note

The first time you start the Internet Advisor WAN software, you will be required to provide some registration information. Several dialog boxes prompt you for information such as user name, company name, etc. You can accept the default selections by pressing ENTER. In addition, you will be prompted for an authenticity number. The number you should enter is located on the Internet Advisor mainframe.

Connecting to the Network

There are a number of ways to connect the Internet Advisor WAN to the network, each of which depends on the kind of analysis you plan to perform. This part of the chapter describes, in general terms, the kinds of connections that are most often used. The Internet Advisor's online Help contains detailed connection diagrams sorted according to physical interface and network analysis type.

Note

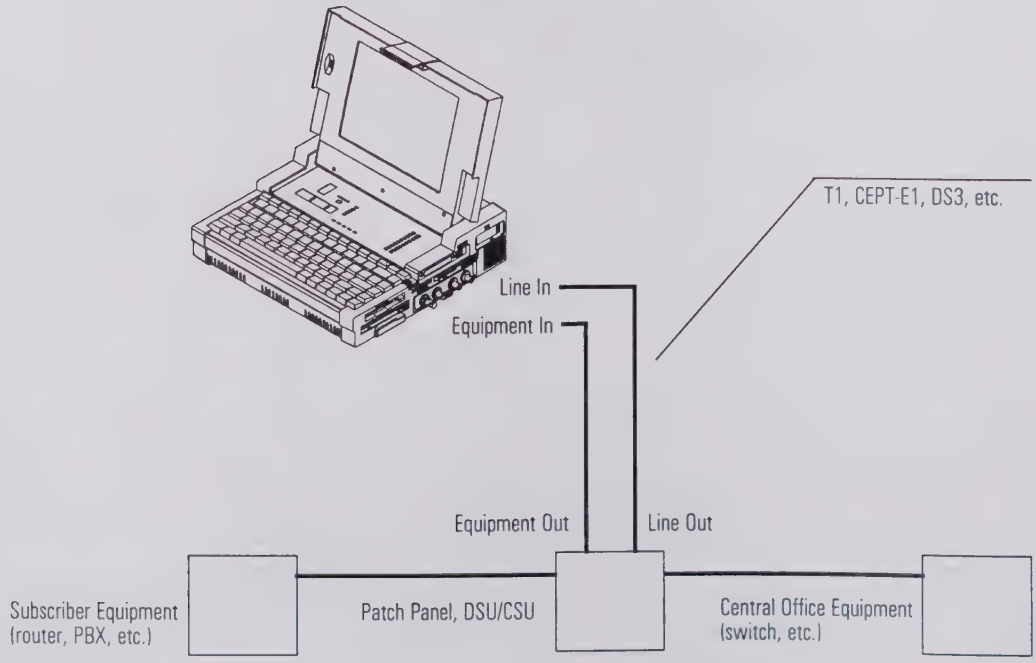
The type of connection you use affects how the Internet Advisor's physical interface is configured. The connection diagrams in the online Help provide the necessary configuration information.

Monitor Connections

The most common connections are those used for passive monitoring. There are two types, patch panel connections and pass-through/bridged connections.

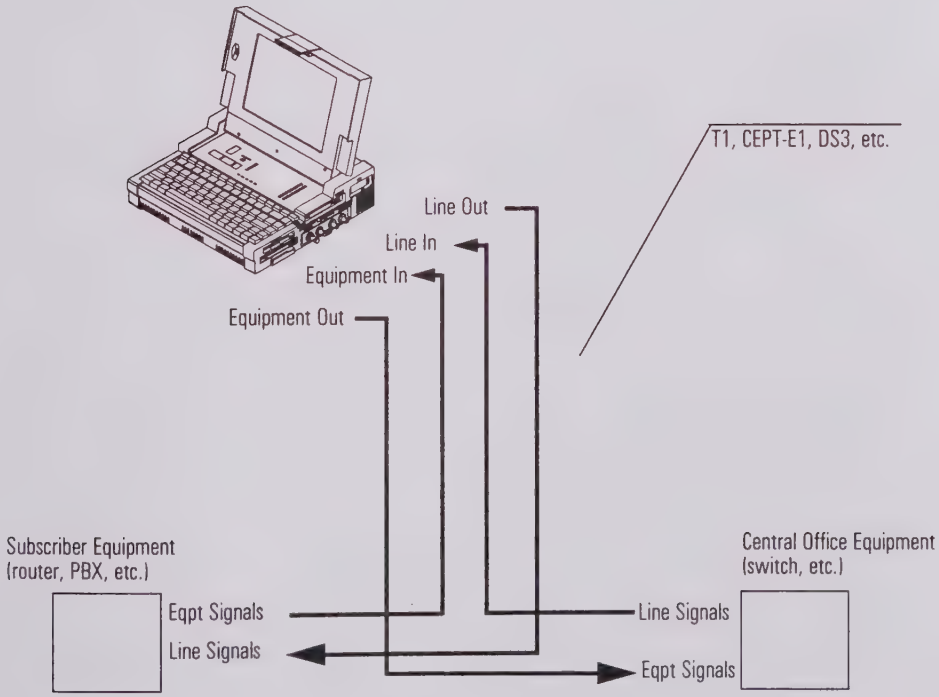
Patch Panel Connections

Many WAN installations provide dedicated patch panels that are used to monitor network traffic non-intrusively. These monitor ports are usually located at DSUs/CSUs, network switches, or at key points throughout a network. The Internet Advisor is most often connected between subscriber/end-user equipment and central office switches, but is also used in service provider's WAN network.



Pass-Through/Bridged Connections

Sometimes it is necessary to pass the monitored traffic through the Internet Advisor. This is often the case when a dedicated patch panel is not available, or when you anticipate performing intrusive simulation or bit error rate tests later and only want to break the network connection one time. Depending on the physical interface you are using, network signals may be regenerated by the Advisor.



Please refer to the Internet Advisor's online Help for detailed connection diagrams for all of the supported physical interfaces.

Simulation, Traffic Generation, BERT Connections

Testing that requires the Internet Advisor to transmit traffic onto the network uses connections somewhat different than that used by passive monitoring. There are two basic types:

Terminated Connections

Terminated connections are used when the Internet Advisor replaces a device on either end of a network segment; for example, when the Advisor is used to emulate customer premises equipment in conversation with a network switch. This connection method does not allow network traffic to be transmitted to devices beyond the Internet Advisor.

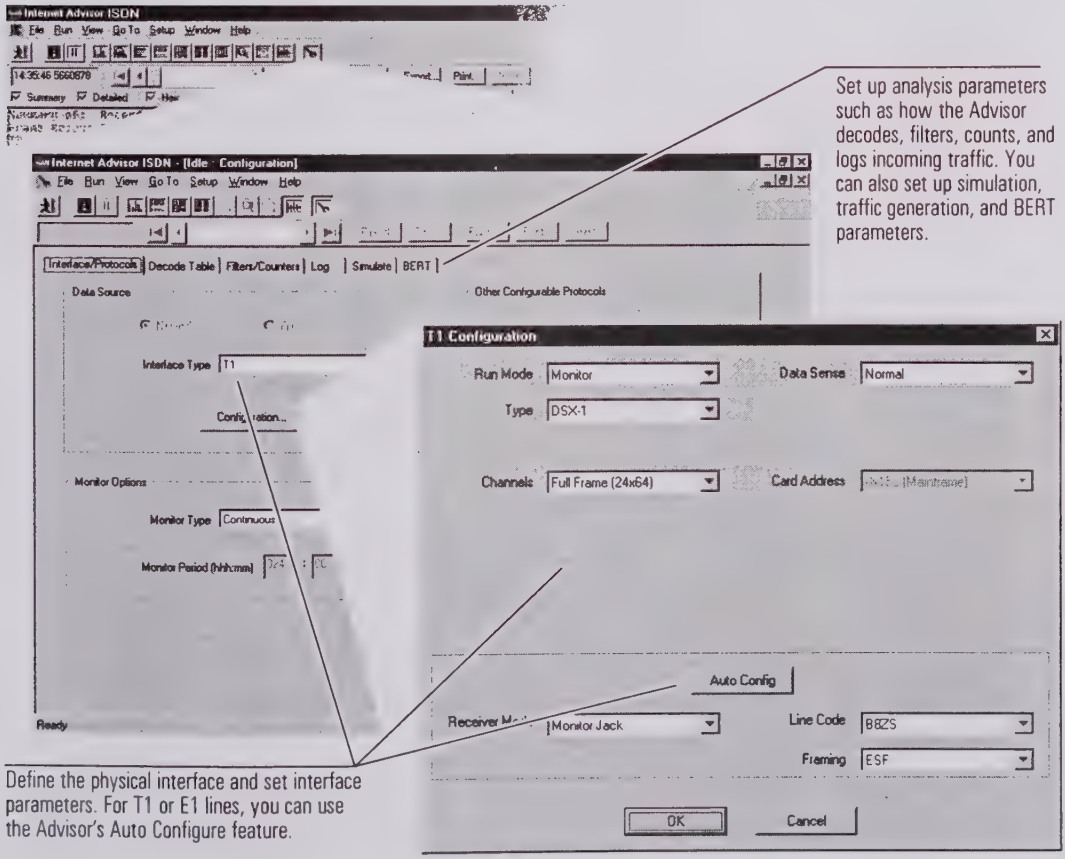
Pass-through or Through/Drop & Insert Connections

Through/Drop and Insert is used when testing T1, CEPT E1, or DS3 lines in which you want to simulate, generate traffic, or perform BERT on one or more channels without interfering with the other channels that are in operation.

You can find connection diagrams for simulation, traffic generation, and BERT in the Internet Advisor's online Help.

Configuring the Instrument

Even though supplied tests configure the Internet Advisor for most measurement situations, there are times when you need to 'fine-tune' the configuration for unique network conditions or measurement requirements. All configuration parameters can be saved and reused later.

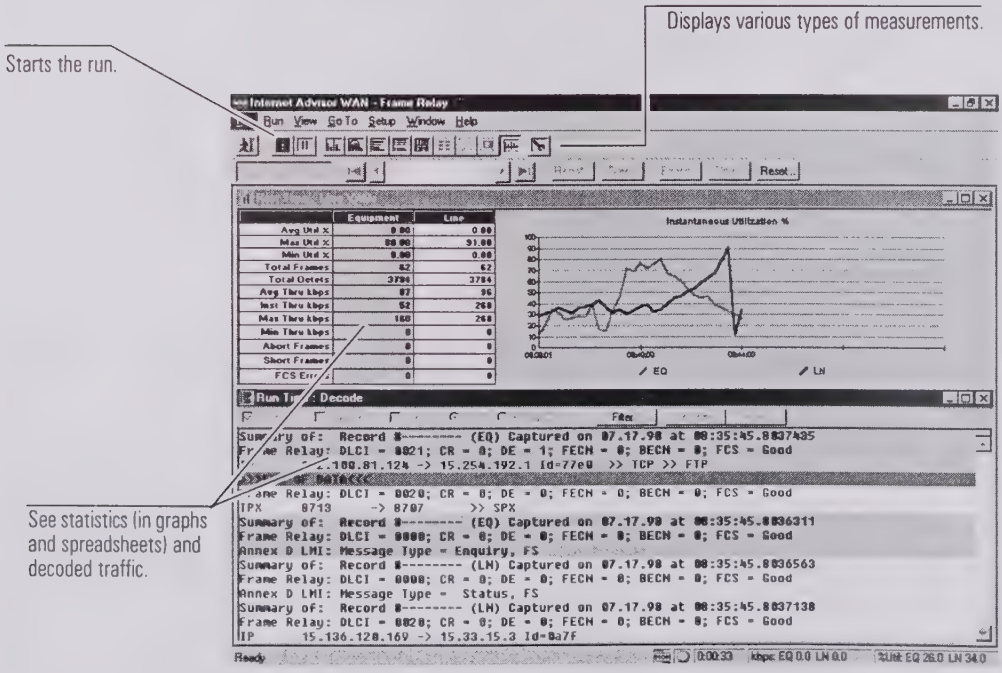


Set up analysis parameters such as how the Advisor decodes, filters, counts, and logs incoming traffic. You can also set up simulation, traffic generation, and BERT parameters.

Define the physical interface and set interface parameters. For T1 or E1 lines, you can use the Advisor's Auto Configure feature.

Starting a Test and Viewing the Results

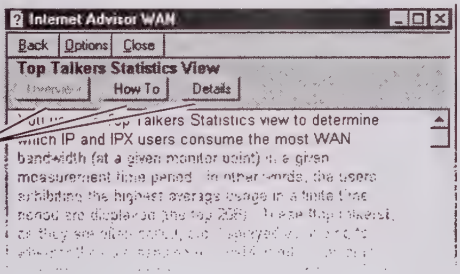
Once you have selected the test, connected to the network, and fine-tuned the configuration (if necessary), you can start the test and view data in the Internet Advisor's measurement views.


Displays various types of measurements.
Starts the run.
See statistics (in graphs and spreadsheets) and decoded traffic.
Internet Advisor WAN - Frame Relay
Run View GoTo Setup Window Help
Reset...
Equipment
Line
Avg Util %
Max Util %
Min Util %
Total Frames
Total Octets
Avg Thru kbps
Inst Thru kbps
Max Thru kbps
Min Thru kbps
Abort Frames
Short Frames
FCS Errors
Instantaneous Utilization %
EQ
LN
Run Time: Decode
Filter
Summary of: Record #-------- (EQ) Captured on 07.17.98 at 08:35:45.8837495
Frame Relay: DLCI = 0021; CR = 0; DE = 1; FECN = 0; BECN = 0; FCS = Good
Frame Relay: DLCI = 0020; CR = 0; DE = 0; FECN = 0; BECN = 0; FCS = Good
IPX 8719 -> 8707 >> SPX
Summary of: Record #-------- (EQ) Captured on 07.17.98 at 08:35:45.8836311
Frame Relay: DLCI = 0000; CR = 0; DE = 0; FECN = 0; BECN = 0; FCS = Good
Annex D LMI: Message Type = Enquiry, FS
Summary of: Record #-------- (LN) Captured on 07.17.98 at 08:35:45.8836563
Frame Relay: DLCI = 0000; CR = 0; DE = 0; FECN = 0; BECN = 0; FCS = Good
Annex D LMI: Message Type = Status, FS
Summary of: Record #-------- (LN) Captured on 07.17.98 at 08:35:45.8837138
Frame Relay: DLCI = 0020; CR = 0; DE = 0; FECN = 0; BECN = 0; FCS = Good
IP 15.136.128.169 -> 15.33.15.3 Id=8a7f
Ready

Finding More Information

Internet Advisor WAN Online Help

The Internet Advisor WAN has an extensive online Help system. You can quickly find information for the currently displayed measurement view or dialog box by pressing **F1**.



Help for the active measurement view or dialog box is organized using the Overview, How To, and Details buttons.

You can also browse the Help system using the Help menu which provides access to the Table of Contents, Index, and Full Text Search feature. In addition, the *Internet Advisor WAN Analysis and Troubleshooting Guide* gives you network troubleshooting and analysis information.

Sample Tests

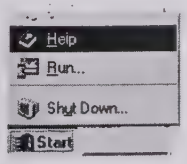
The next chapter in this book describes examples of using the Advisor to make measurements on your network.

Other Internet Advisor Books

Each of the technologies that can be tested with the Internet Advisor has a separate Getting Started manual. Use the appropriate Getting Started manual when you need to test another network technology.

Windows Online Help

You can find information on general Windows operation from the online Help tutorial. It is a good idea to spend a few minutes learning the basic functions and terminology associated with the Windows environment.



3

- Examining Traffic on a Frame Relay Network, page 3-3
- Finding the Cause of Unexpected Call Disconnects on an Integrated Services Digital Network (ISDN), page 3-12

Sample Tests

Sample Tests

This chapter provides two examples of how to use the Internet Advisor to analyze WAN traffic and solve WAN problems. The following examples are designed to give you a basic understanding of the Advisor's operation and features:

- Examining traffic on a Frame Relay network
- Finding the cause of unexpected call disconnects in an ISDN environment

These examples will illustrate the monitor, simulation, and BERT capabilities of the Internet Advisor.

To learn more...

For more information about how to use the features of the Internet Advisor, refer to the "How Do I..." section of the online Help. You can also press F1 while in the Internet Advisor WAN application to get specific information about the window, measurement view, or dialog box you are looking at.

Examining Traffic on a Frame Relay Network

This example illustrates how you would use the Internet Advisor WAN to monitor network traffic on a Frame Relay network. The example will go through the steps necessary to monitor a T1 link that connects a Frame Relay access device (FRAD) at the 'edge' of a corporate LAN to a Frame Relay switch (FRS) located at a service provider's central office. This example will demonstrate how to:

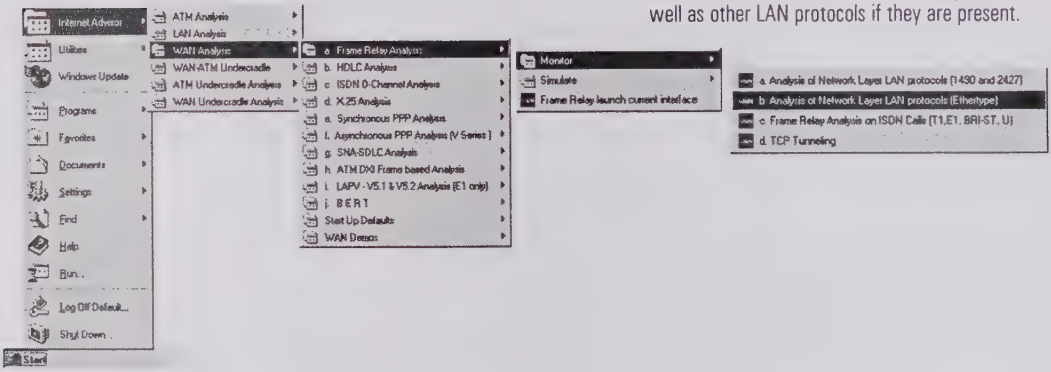
- Verify that the physical layer is functioning properly.
- Check the general condition of data transmission on the line.
- Look at traffic distribution according to DLCIs.
- Look at Filters/Counters to see what kind of LAN traffic is present.
- Identify the IP or IPX addresses using the most bandwidth.
- Decode the network traffic.

The steps shown here represent a common troubleshooting method and can be modified to suit many other test situations.

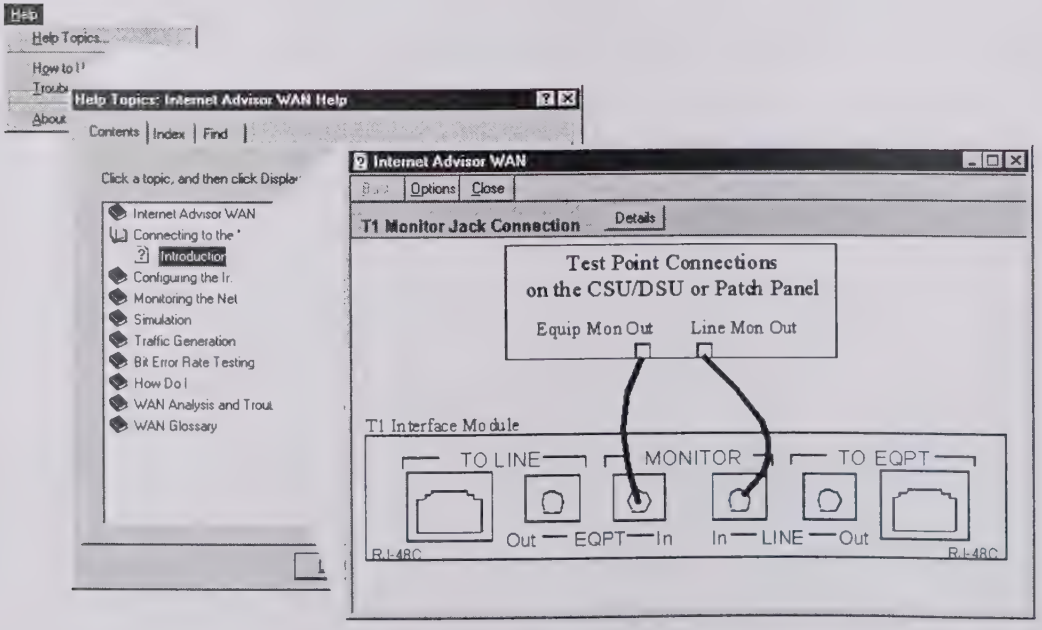
To begin, you need to have properly installed a T1 interface module into the Internet Advisor, have gone to the location where you will connect the Advisor to the network, and have turned the Advisor on.

① **Select the 'Analysis of Network Layer LAN Protocols' test as shown here.**

This test configures the Advisor to decode and count IP and IPX traffic carried on a Frame Relay network, as well as other LAN protocols if they are present.



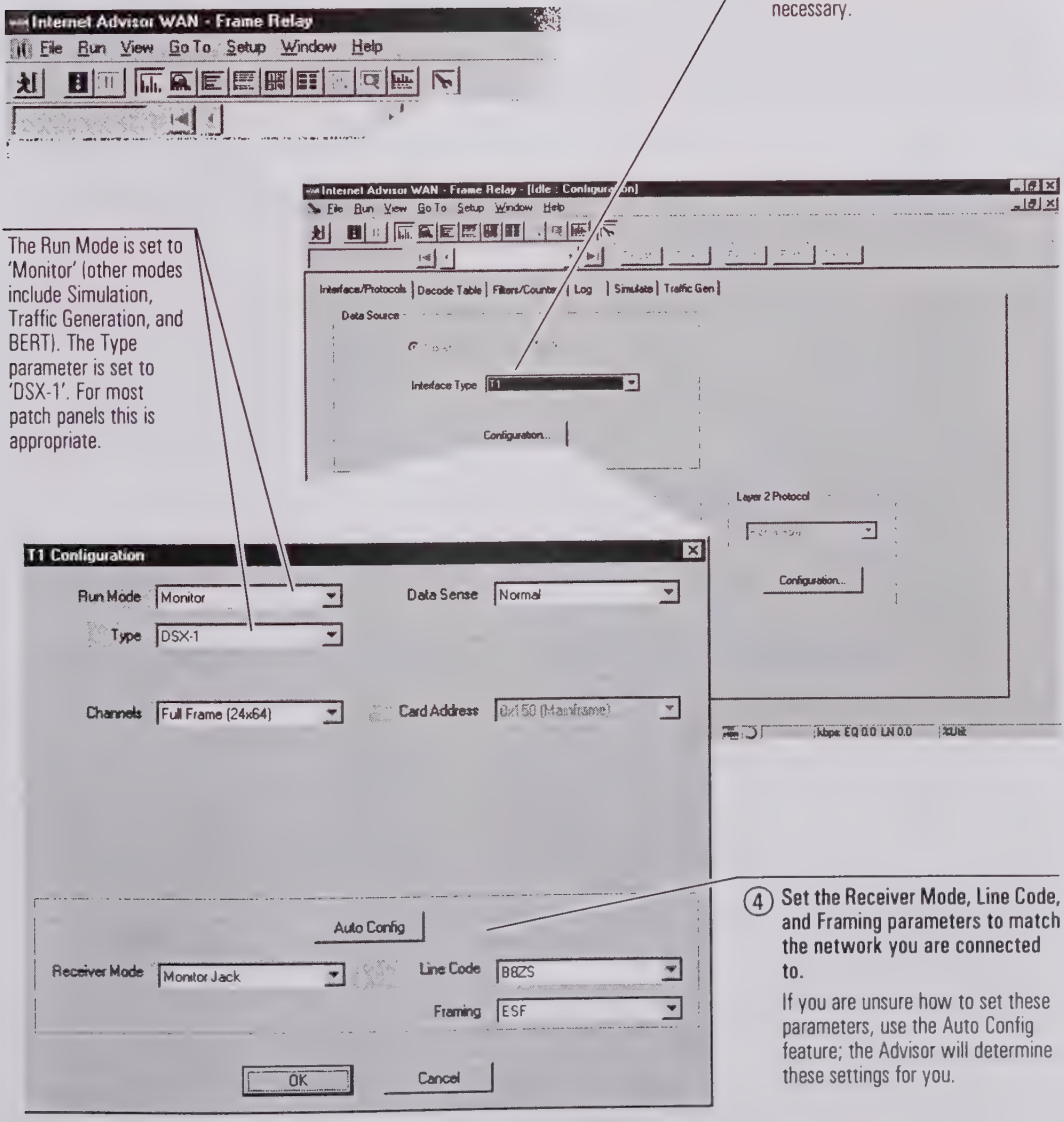
② **Look in the online Help for the T1 Monitor Jack connection. This is the connection you would use to perform this kind of analysis.**



③ **Confirm and fine-tune the configuration provided by the 'Analysis of Network Layer LAN Protocols' supplied test.**

The Interface Type is configured for T1. You can change this if necessary.

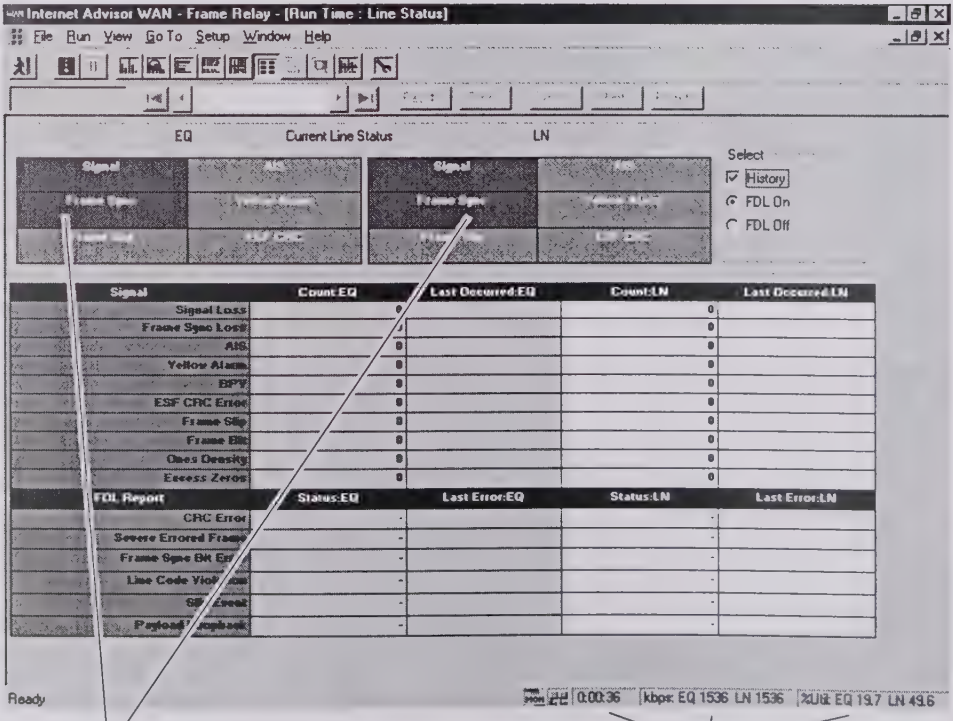
The Run Mode is set to 'Monitor' (other modes include Simulation, Traffic Generation, and BERT). The Type parameter is set to 'DSX-1'. For most patch panels this is appropriate.



④ **Set the Receiver Mode, Line Code, and Framing parameters to match the network you are connected to.**

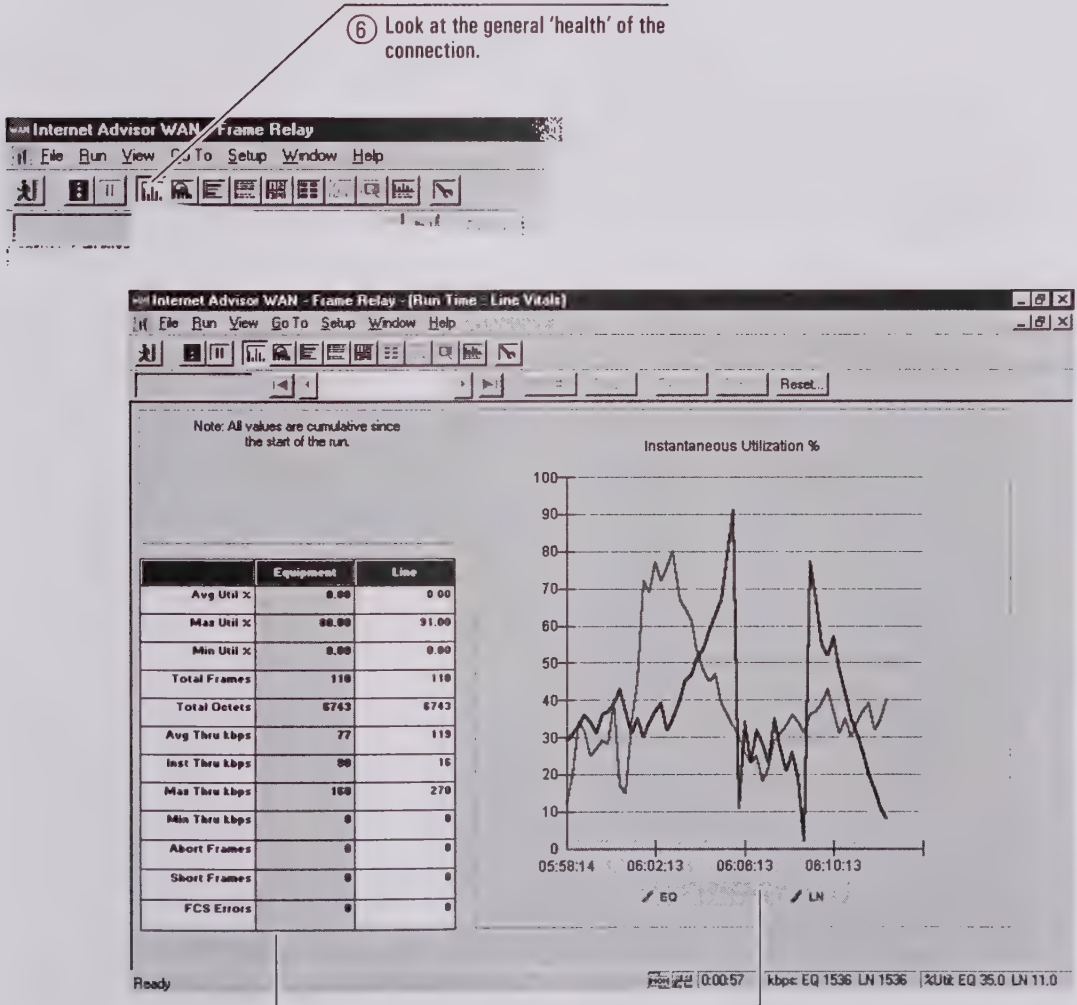
If you are unsure how to set these parameters, use the Auto Config feature; the Advisor will determine these settings for you.

⑤ Start the test and make sure the physical layer is operating correctly.



Green 'soft' LEDs indicate that a usable signal is detected and that frame synchronization is being maintained. In addition, no errors are being counted or timestamped. You can conclude that the physical link seems to be operating correctly. If red LEDs are present, or if more than a small number of errors are counted, there may be problems with the physical layer or the Advisor may be configured incorrectly for the network under test.

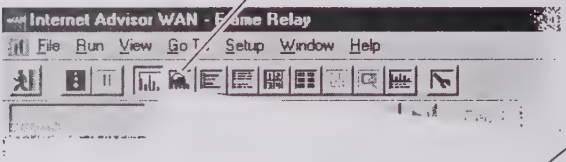
The Status Bar shows run-time information about the elapsed time, line rate, and utilization.



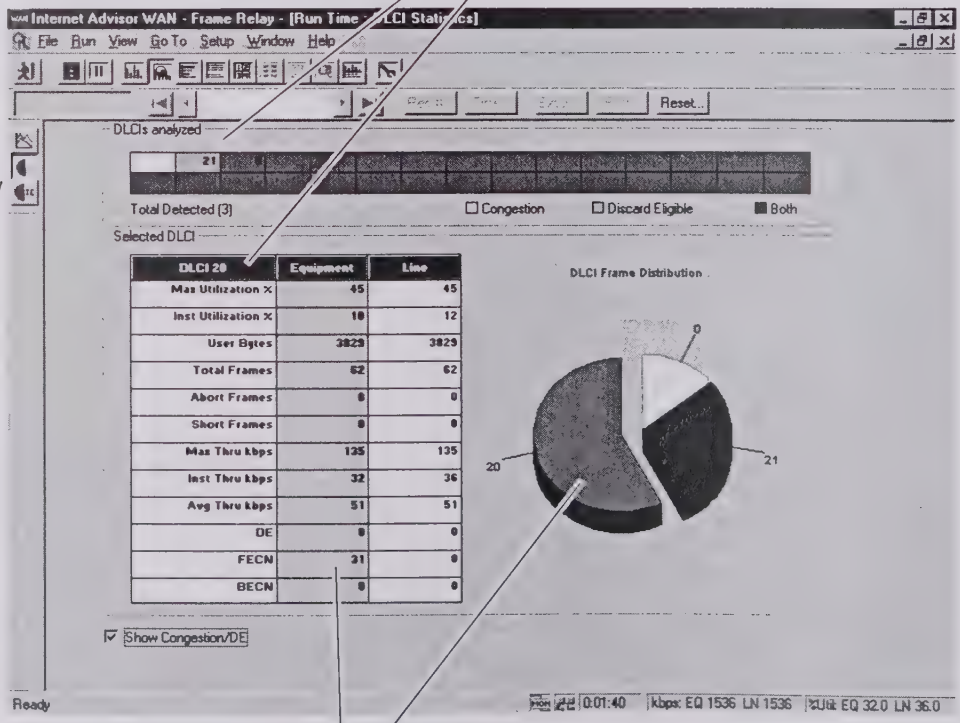
You can see the utilization, frame and octet counts, and throughput updated for both the Line and Equipment sides of the connection. The lack of errors is further indication that physical transmission is operating correctly.

The graph shows instantaneous utilization. You can see that traffic occasionally bursts as high as 90%.

⑦ Look at network traffic according to DLCIs.



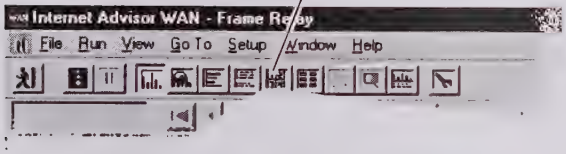
Three DLCIs have been detected. You can click on one to display its statistics in the spreadsheet (DLCI 20 is selected here).

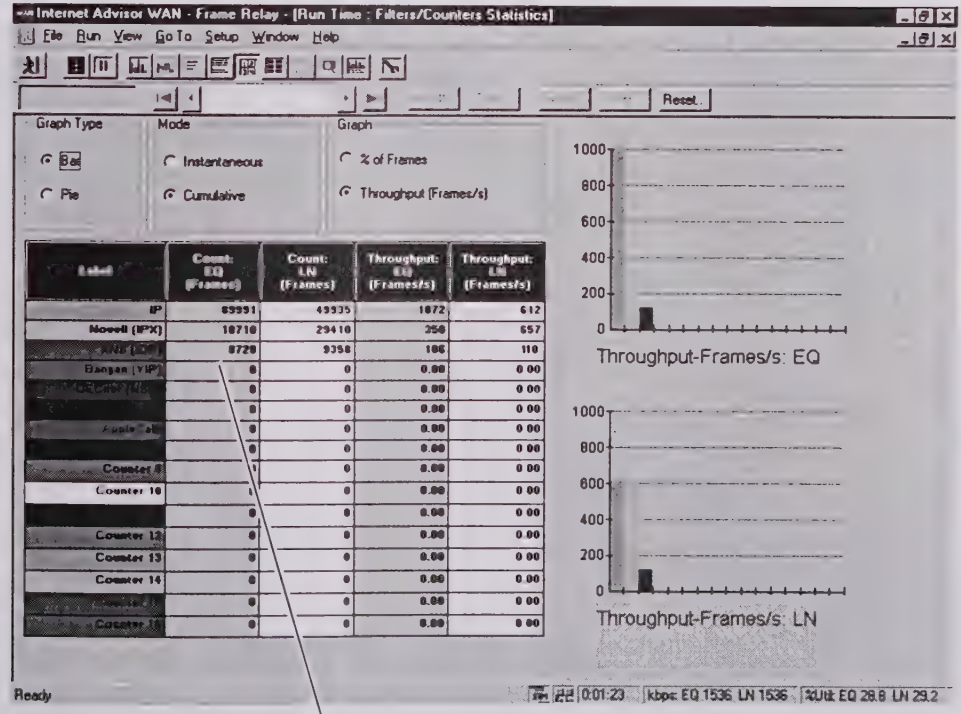

Internet Advisor WAN - Frame Relay - [Run Time - DLCI Statistics]
File Run View Go To Setup Window Help
Reset...
DLCIs analyzed
21
Total Detected (3)
Congestion
Discard Eligible
Both
Selected DLCI
DLCI 20 | Equipment | Line
Max Utilization % | 45 | 45
Inst Utilization % | 10 | 12
User Bytes | 3829 | 3829
Total Frames | 62 | 62
Abort Frames | 0 | 0
Short Frames | 0 | 0
Max Thru kbps | 135 | 135
Inst Thru kbps | 32 | 36
Avg Thru kbps | 51 | 51
DE | 0 | 0
FECN | 31 | 0
BECN | 0 | 0
DLCI Frame Distribution
0
20
21
Show Congestion/DE
Ready
0:01:40
kbps: EQ 1536 LN 1536
%Util: EQ 32.0 LN 36.0

You can use these buttons to change the contents and display format of the graph. The choices are Instantaneous Utilization, DLCI Frame Distribution (shown here), and DLCI Byte Distribution.

Notice that the some of the frames associated with DLCI 20 have the Forward Explicit Congestion Notification bit set. This indicates some congestion problems on the Equipment side of the test connection. Also notice that DLCI 20 is using more of the bandwidth than the others.

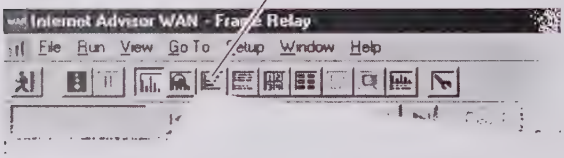
⑧ Use the filters and counters set up by the supplied test to see what kind of LAN traffic is present on the network.



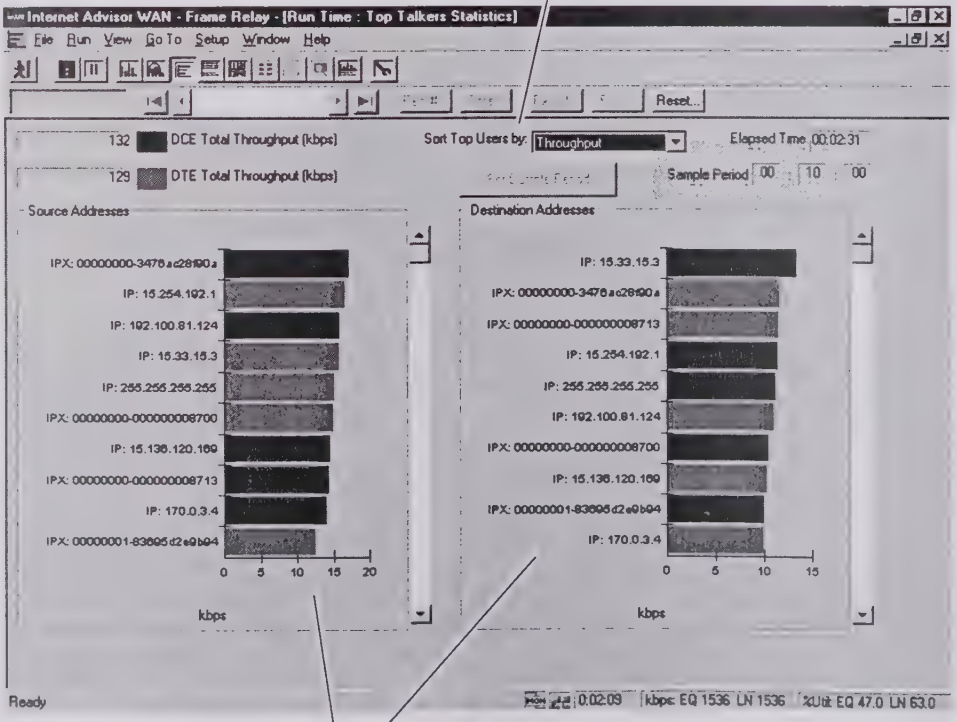


The filters/counters indicate the presence of IP, IPX, and XNS traffic on the network. The frame count and throughput values show that the IP traffic is the most prevalent.

⑨ Determine which of the IP and IPX addresses is using the most bandwidth.

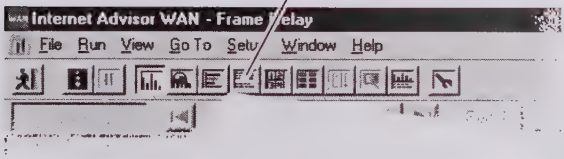


You can define how you want the information sorted; throughput is shown here. Other measurement parameters include% of Total Frames, Frame Rate, and Utilization.

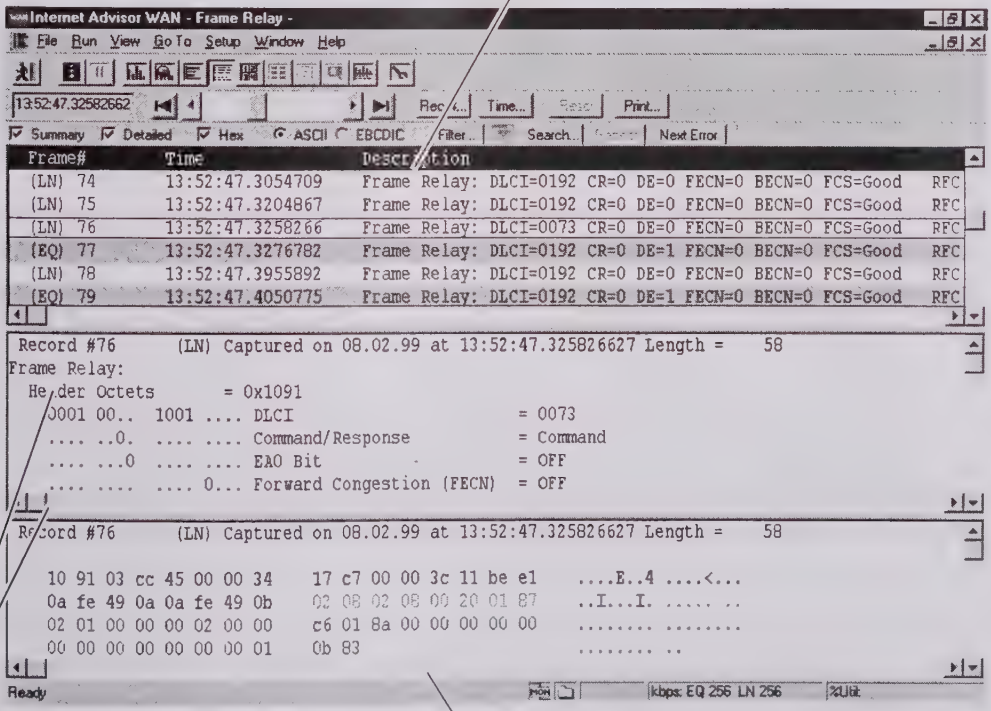


You can see which IP and IPX users are transmitting the most data, sorted according to source and destination. This view is updated every two seconds and represents the average 'top talkers' in the current measurement period.

⑩ **Look at the decoded traffic.**



The Summary portion of the view shows essential information related to each of the incoming frames. Here you can see the Frame Relay DLCI value as well as congestion bits and FCS results. In addition, you can see that IP packets are carried in the Frame Relay frames.


Internet Advisor WAN - Frame Relay -
File Run View Go To Setup Window Help
13:52:47.32582662
Time...
Print...
Summary
Detailed
Hex
ASCII
EBCDIC
Filter...
Search...
Next Error
Frame# Time Description
(LN) 74 13:52:47.3054709 Frame Relay: DLCI=0192 CR=0 DE=0 FECN=0 BECN=0 FCS=Good RFC
(LN) 75 13:52:47.3204867 Frame Relay: DLCI=0192 CR=0 DE=0 FECN=0 BECN=0 FCS=Good RFC
(LN) 76 13:52:47.3258266 Frame Relay: DLCI=0073 CR=0 DE=0 FECN=0 BECN=0 FCS=Good RFC
(EQ) 77 13:52:47.3276782 Frame Relay: DLCI=0192 CR=0 DE=1 FECN=0 BECN=0 FCS=Good RFC
(LN) 78 13:52:47.3955892 Frame Relay: DLCI=0192 CR=0 DE=0 FECN=0 BECN=0 FCS=Good RFC
(EQ) 79 13:52:47.4050775 Frame Relay: DLCI=0192 CR=0 DE=1 FECN=0 BECN=0 FCS=Good RFC
Record #76 (LN) Captured on 08.02.99 at 13:52:47.325826627 Length = 58
Frame Relay:
Header Octets = 0x1091
0001 00.. 1001 .... DLCI = 0073
.... ..0. .... Command/Response = Command
....0 .... EA0 Bit = OFF
.... 0... Forward Congestion (FECN) = OFF
Record #76 (LN) Captured on 08.02.99 at 13:52:47.325826627 Length = 58
10 91 03 cc 45 00 00 34 17 c7 00 00 3c 11 be e1 ....E..4 ....<...
0a fe 49 0a 0a fe 49 0b 02 08 02 08 00 20 01 87 ..I...I. ....
02 01 00 00 00 02 00 00 c6 01 8a 00 00 00 00 00 ....
00 00 00 00 00 00 00 01 0b 83 ....
Ready
kbps: EQ 256 LN 256
%Util

In the Detail portion of the view, you can see the contents of individual frames. Here we see details of the Frame Relay header and the beginning of details of the IP packet. You can scroll to see more information about the rest of the frame.

The Hexadecimal portion of the view shows the actual byte values of the incoming frame.

Finding the Cause of Unexpected Call Disconnects on an Integrated Services Digital Network (ISDN)

Test scenario:
ISDN basic rate service has recently been installed at a small business that uses it to connect their LAN (ten workstations) to a remote office. Because communication between the LAN and the remote office is somewhat infrequent, this service is provided via a basic rate S/T interface (passive bus). During file transfers, users are sometimes unexpectedly disconnected. Less often, but equally disruptive, users are unable to make connections at all.

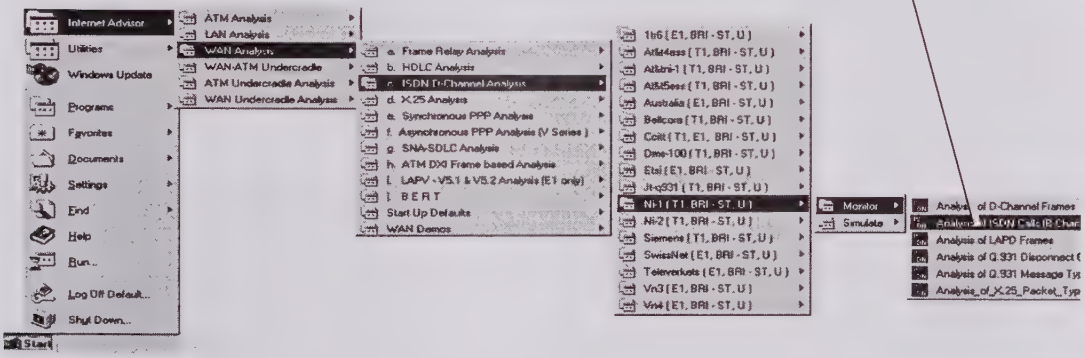
To solve this problem:

- Monitor the S/T interface to determine the cause of the disconnects; look at an overview of ISDN call activity on the S/T interface.
- Run a call placement simulation to establish the B-channels. This verifies that calls can be placed and sets the stage for further testing.
- Run a bit error rate test (BERT) to evaluate the transmission quality of the line.

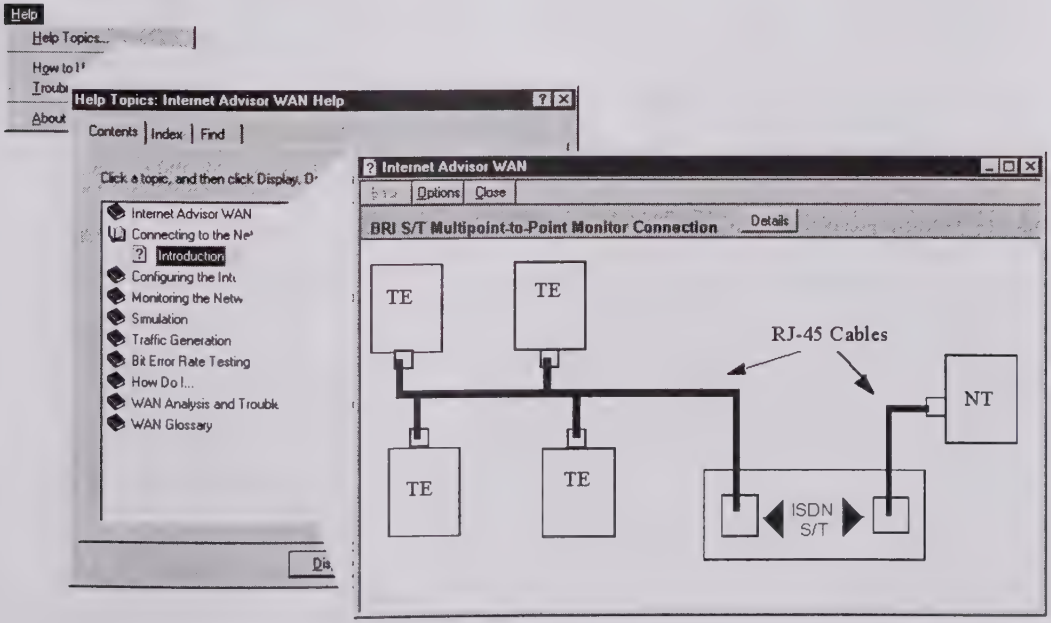
To begin, you need to have properly installed the ISDN BRI S/T interface module into the Internet Advisor, have gone to the location where you will connect the Advisor to the network, and have turned the Advisor on.

① **Select the 'Analysis of ISDN Calls' supplied test to start the Internet Advisor ISDN application.**

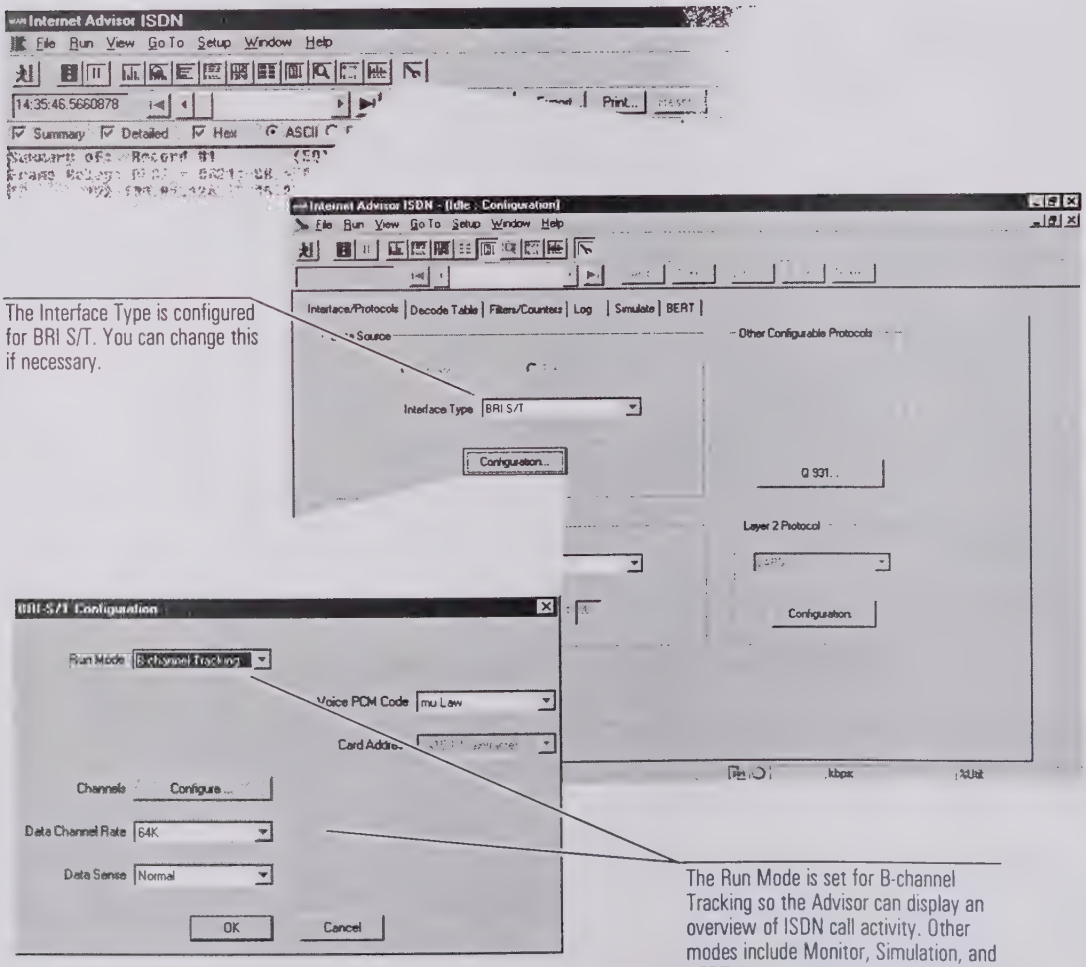
This test configures the Advisor's physical interface, and enables the B-channel Tracking measurement so that we can display an overview of ISDN call activity.



② **Look in the online Help for the connection diagram for a BRI S/T monitor connection. This is the connection you would use for this type of analysis.**



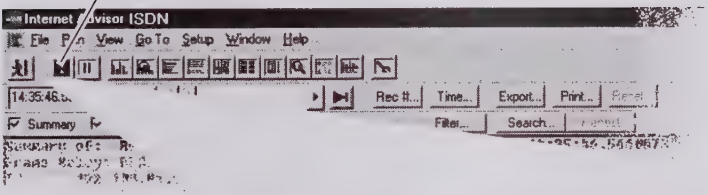
③ Confirm the configuration provided by the 'Analysis of ISDN Calls' supplied test.



The Interface Type is configured for BRI S/T. You can change this if necessary.

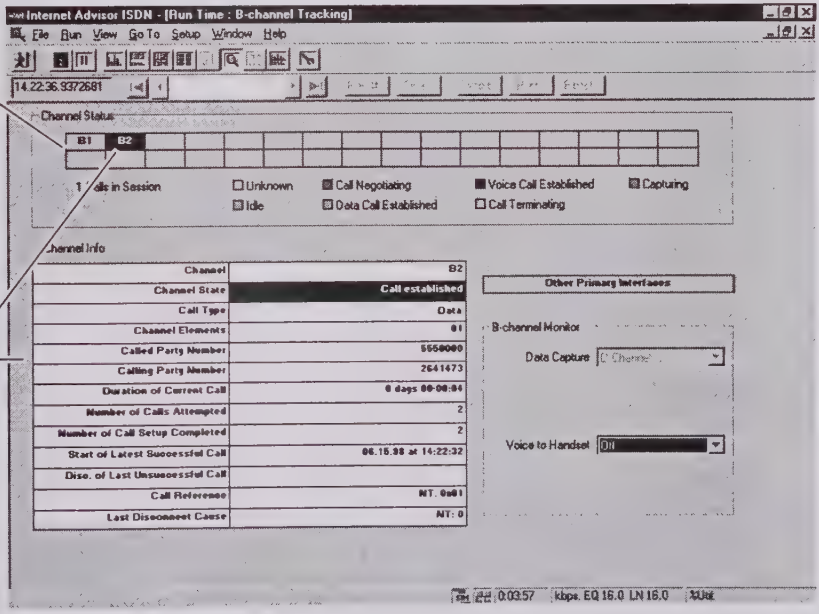
The Run Mode is set for B-channel Tracking so the Advisor can display an overview of ISDN call activity. Other modes include Monitor, Simulation, and BERT. You can change other aspects of the physical interface set up in situations that require it.

④ Start the monitor run.

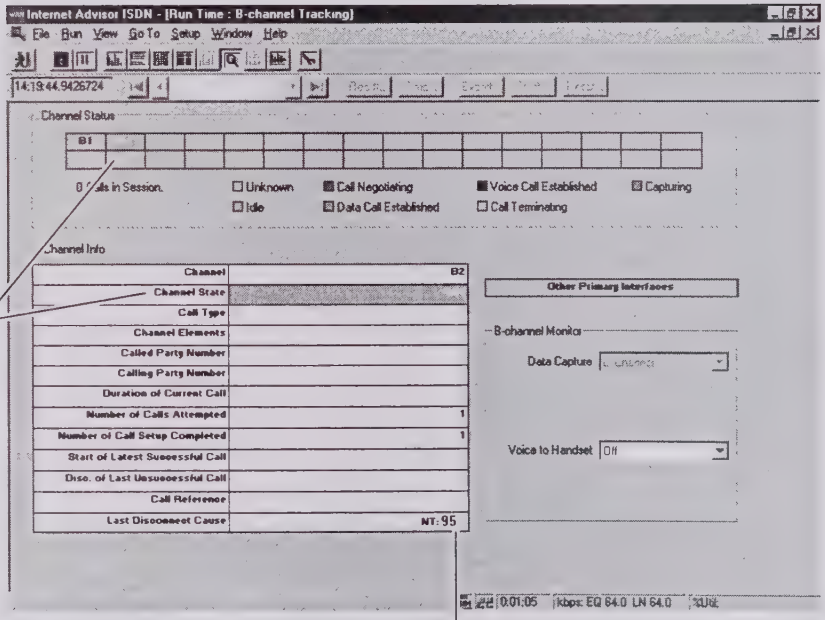


Call activity for the both channels of the S/T interface is displayed via colored indicators. Notice that a call is established on B2.

⑤ Click B2 to display detailed information about the call in the spreadsheet.



To understand why calls are unexpectedly disconnected, observe the call activity until a disconnect occurs. This is shown in the Channel Status indicators at the top of this measurement view. In this example, assume B2 disconnects abnormally (shown in next illustration).



The color of the indicator and the Channel State field both show that B2 has become idle.

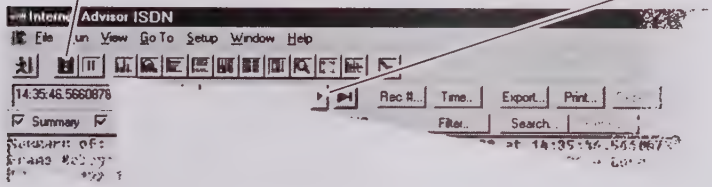
The Last Disconnect Cause shows the cause code associated with the disconnection. Because this cause code is shown in the ITU-T specification as 'invalid message, unspecified', you need to seek more information.

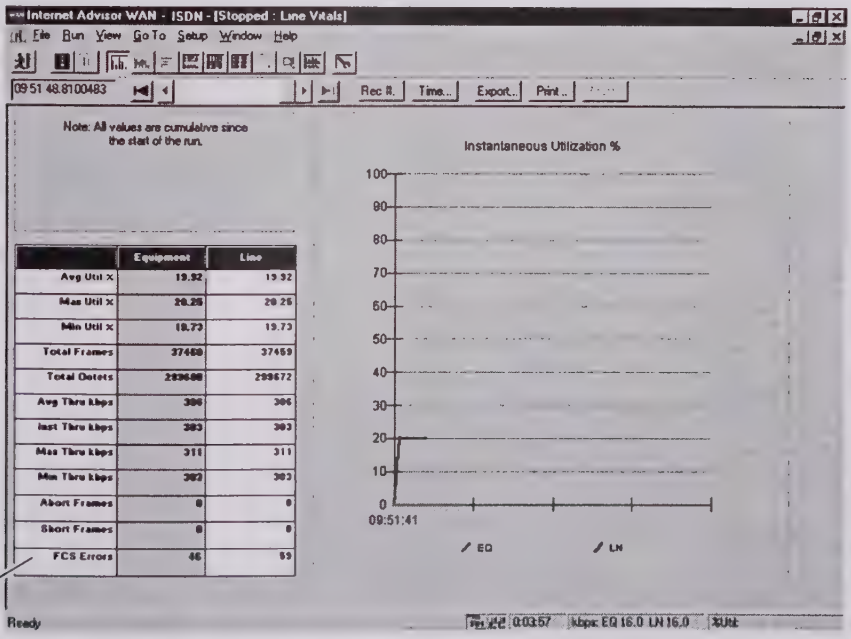
⑥ Stop the run and open the Line Vitals view.

Frame data and statistics are held in the Advisor's buffer. Looking at statistics that were gathered just prior to the call's disconnection may provide more information about the cause.

⑦ Use the Browse Bar to move back through the buffered statistics.

The goal is to see if there was a large jump in errors just prior to the disconnect.

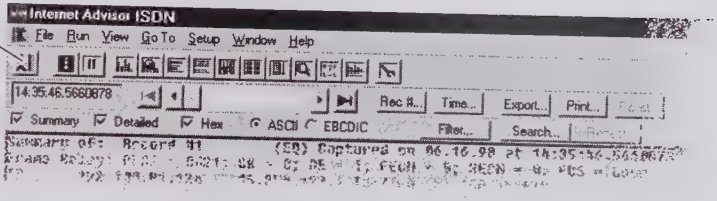




Just before the disconnect, the FCS error increased.

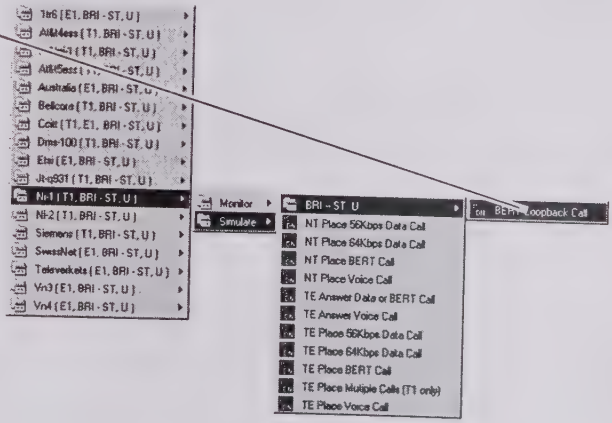
Because the cause code was 'invalid message, unspecified', and because just before the disconnection a relatively large number of FCS errors were recorded, you suspect that the problem may be related to excessive bit errors on the line. To confirm this, you can run a bit error rate test (BERT). This is shown next.

⑧ Close the application so you can select and run the appropriate ISDN BERT test.

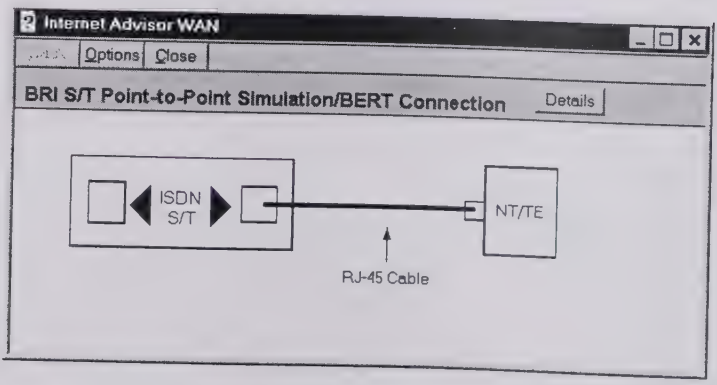


⑨ Similar to Step 1, select the 'TE BERT Loopback Call' supplied test. Notice that this time you will select a 'Simulation' test.

This test configures the Advisor to be able to place a loopback call (as a TE device) on the BRI B-channels through the use of a call placement simulation. The test also configures the Advisor to be able to run BERT once the loopback call has been established.


1tr6 (E1, BRI - ST, U)
Australia (E1, BRI - ST, U)
Belcore (T1, BRI - ST, U)
Coit (T1, E1, BRI - ST, U)
Dms100 (T1, BRI - ST, U)
Etsi (E1, BRI - ST, U)
Ni-1 (T1, BRI - ST, U)
Ni-2 (T1, BRI - ST, U)
Siemens (T1, BRI - ST, U)
SwissNet (E1, BRI - ST, U)
Vn3 (E1, BRI - ST, U)
Vn4 (E1, BRI - ST, U)
Monitor
Simulate
BRI - ST, U
NT Place 56Kbps Data Call
NT Place 64Kbps Data Call
NT Place BERT Call
NT Place Voice Call
TE Answer Data or BERT Call
TE Answer Voice Call
TE Place 56Kbps Data Call
TE Place 64Kbps Data Call
TE Place BERT Call
TE Place Multiple Calls (T1 only)
TE Place Voice Call
BERT Loopback Call

⑩ To simulate a TE device, make a point-to-point connection between the Advisor and the NT. This will require that the connection between the TEs and the NT be broken. The correct connection diagram from the online Help is shown here.

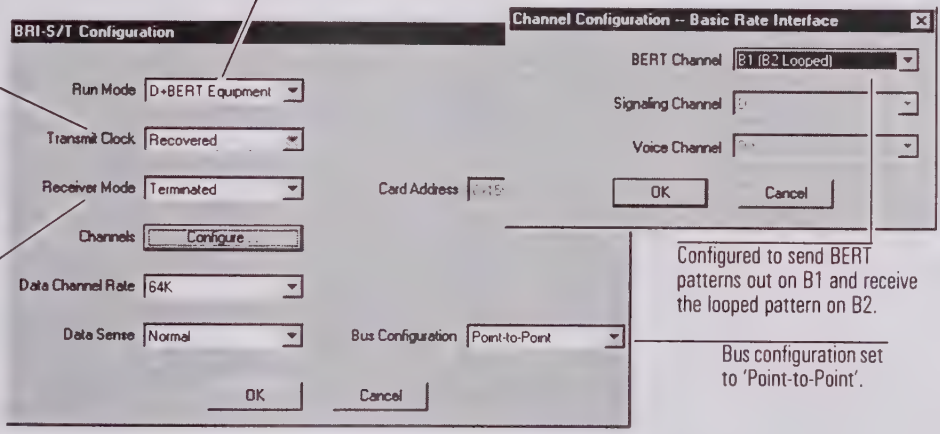


⑪ As in step 3, confirm the configuration provided by the supplied test.

Run Mode set to 'D+BERT' so that the Advisor can set up and maintain the B-channel through D-channel signaling.

Transmit Clock set to 'Recovered' so that the Advisor can use the clock signal sent by the NT.

Receiver Mode set to 'Terminated' because the Advisor is connected at the end of the line.

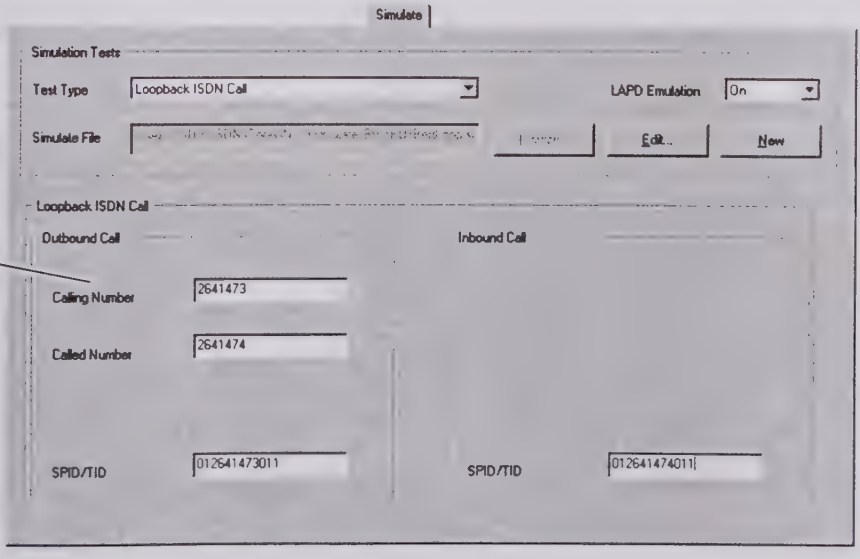


Configured to send BERT patterns out on B1 and receive the looped pattern on B2.

Bus configuration set to 'Point-to-Point'.

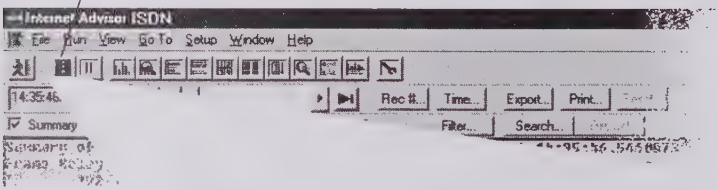
⑫ Set the parameters necessary to place and maintain the loopback call.

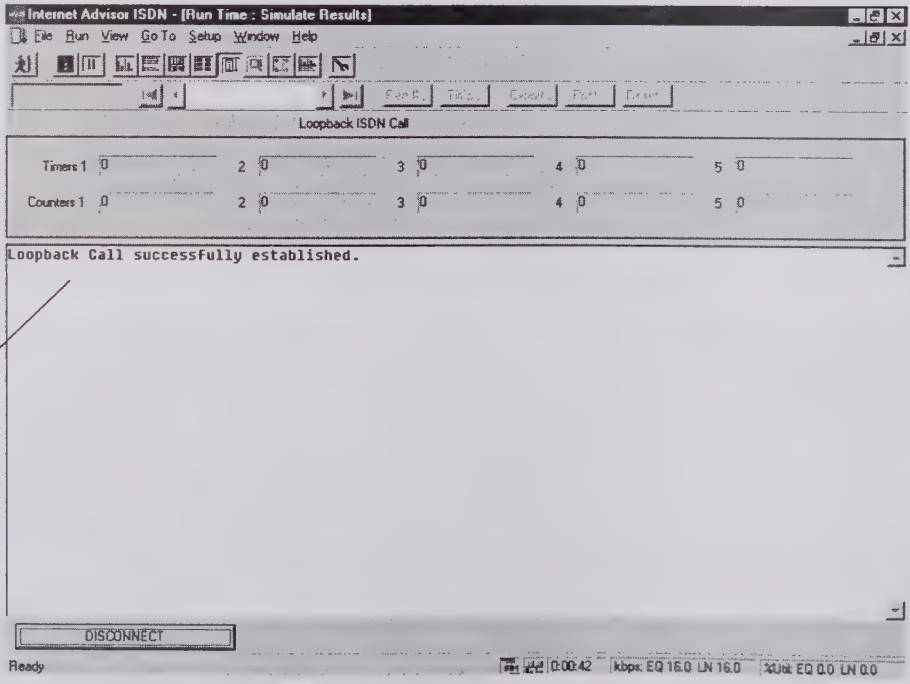
Bring the Simulate folder to the front in the Configuration view.



Type in the Calling and Called Numbers, as well as the SPID/TID values for the B-channels on which the calls will be placed.

⑬ Start the simulation run to establish the B-channels.




Internet Advisor ISDN - [Run Time : Simulate Results]
File Run View GoTo Setup Window Help
Loopback ISDN Call
Timers 1 0 2 0 3 0 4 0 5 0
Counters 1 0 2 0 3 0 4 0 5 0
Loopback Call successfully established.
DISCONNECT
Ready
0:00:42
kbps: EQ 16.0 LN 16.0
EQ 0.0 LN 0.0

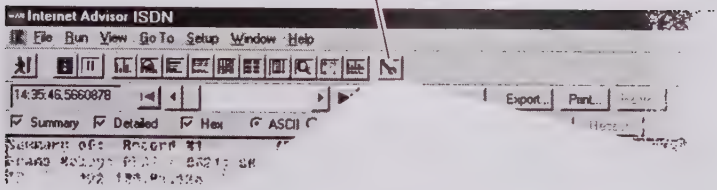
This indicates that the B-channels have been set up.

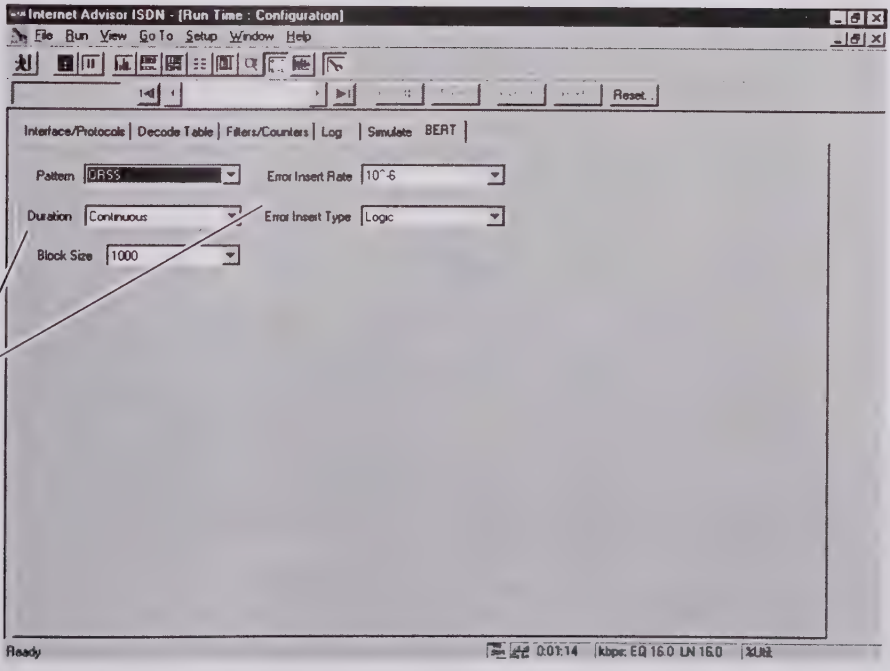
When you are ready to stop the simulation and BERT, use this button to disconnect the call properly. This causes the Advisor to send the appropriate disconnect messages and prevents the switch from resetting the circuit (see step 16).

Note: when you start a simulation/BERT test, error messages may be displayed if you have not set all of the necessary simulation parameters. For example, if you have forgotten to define the Calling Number in the Simulate folder, or the BERT channel in the BRI S/T Configuration dialog box, an error message will be displayed and the simulation script will not execute.

(14) Set or confirm BERT parameters before beginning the BERT run.

While the Advisor maintains the B-channels (via the simulation), you can make sure the BERT pattern and other parameters are what you need.

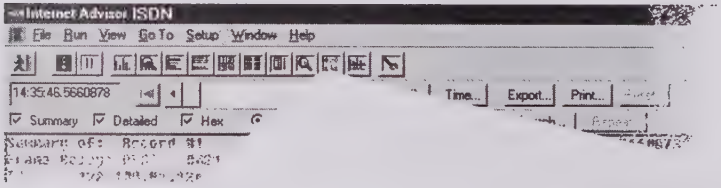


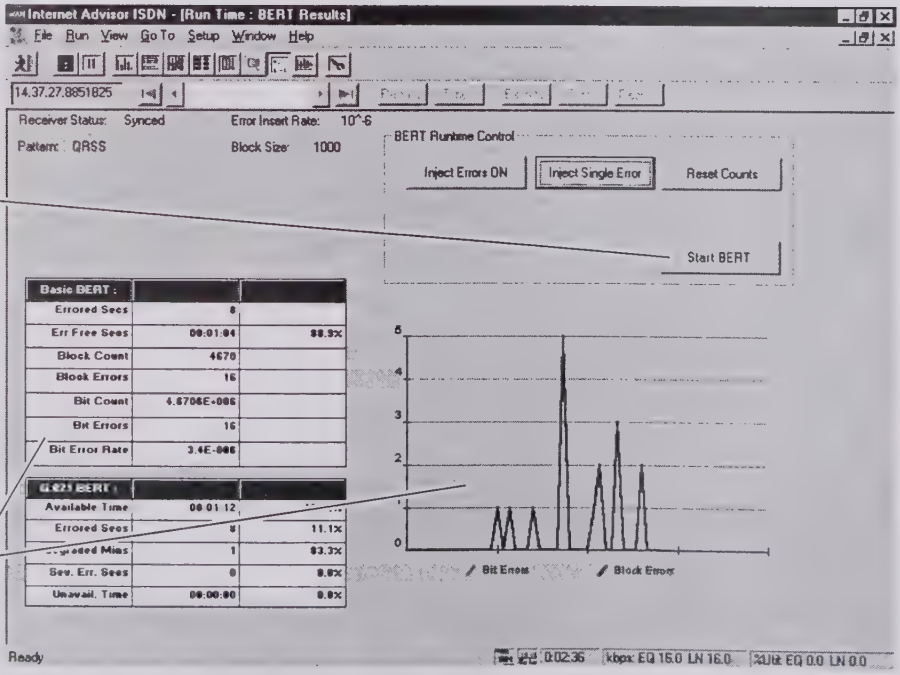


You can select a specific BERT pattern, set the duration of the run, and choose an error rate for intentional error injection.

You can change any of the above parameters *during* a BERT run. You can also save these parameters as part of your configuration to be loaded again using the Merge command from the Advisor's File menu.

⑮ Start the BERT run and look at the results.





Start the BERT run. Use the other buttons in this part of the measurement view to control error injection, reset the statistics display, and so on. Note: the Start BERT button turns to a Stop BERT button when a test is started.

Notice the bit error count and bit error rate recorded since the start of the run. You can also see these statistics displayed in a graphical format.

While this bit error rate is relatively low, it could be enough to garble layer 2 and 3 'keep alive' messages, resulting in calls being unexpectedly disconnected.

⑯ Now that you have found the problem, you need to stop the BERT run and end the simulation that maintains the B-channels. Do this by clicking the Stop BERT button (above), and then clicking the DISCONNECT button in the Simulate Results view (see step 13). Note: using another method to stop the test may cause network switches to reset, thereby disrupting network service.

A

Front Panel LEDs

Front Panel LEDs

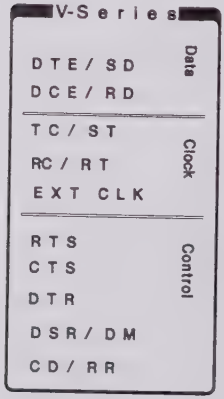
This appendix contains illustrations and descriptions of the front panel LEDs for all of the physical interfaces supported by the Internet Advisor WAN. The front panel LEDs indicate real-time lead state or line status conditions.

Note

For most WAN technologies supported by the Internet Advisor WAN, onscreen 'soft' LEDs are provided via the Line Status view. In addition, a history of lead state or line status conditions is provided. Please see the Advisor's online Help for more information.

V-Series LEDs

The built-in V.35, RS-449, and RS-232 interfaces use the same LEDs and LED labels. The LEDs show Space/On and Mark/Off conditions for V-Series leads. If both LEDs are lit, the lead is toggling between the two states. If the LEDs are dark, there is no signal present.

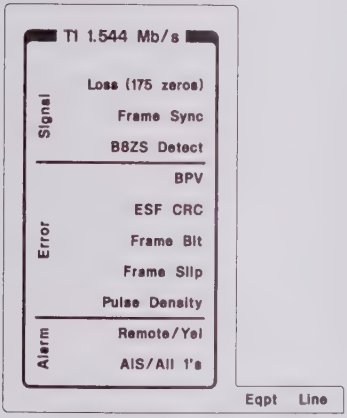


DTE/SD - Send Data.
DCE/RD - Receive Data.
TC/ST - DTE/Send Timing (DCE)
RC/RT - DCE/Receive Timing (DCE)
EXT CLK - for DTE clock source.
RTS - Request to Send
CTS - Clear to Send
DTR - Data Terminal Ready
DSR/DM - Data Set/Mode Ready
CD/RR - Carrier Detect/Receiver Ready

V-Series LEDs can indicate whether a device is physically DTE or DCE. Connect the Internet Advisor to the device under test and configure it for monitoring. If either of the DTE/SD LEDs light up, the device under test is DTE. If DCE/RD LEDs light up, the device under test is DCE.

T1 LEDs

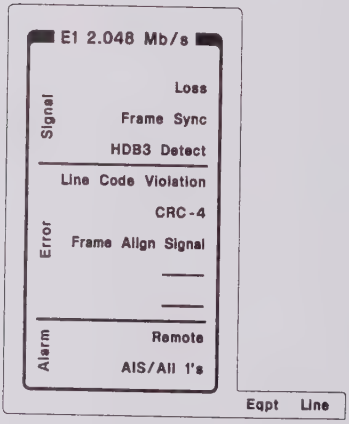
T1 LEDs are provided for both the Line and Equipment sides of the test connection.



Loss - shows red if signal loss has occurred (175 consecutive zeros), and green when usable signal is present.
Frame Sync - shows green when frame synchronization is maintained, dark if it is not.
B8ZS Detect - shows green if B8ZS occurs, dark if it does not.
BPV - shows green for BPVs, dark when none detected.
ESF CRC - shows red when CRCs occur, dark if none detected.
Frame Bit - shows red when a Frame Bit error occurs; dark otherwise.
Frame Slip - shows red when Frame Slip occurs, dark otherwise.
Pulse Density - shows red when not enough signal pulses are present to preserve system timing; dark otherwise.
Remote/Yel - shows red if a Remote or Yellow Alarm occurs, dark otherwise.
AIS/All 1's - shows red when an Alarm Indication Signal is detected on the line, dark otherwise.

CEPT-E1 LEDs

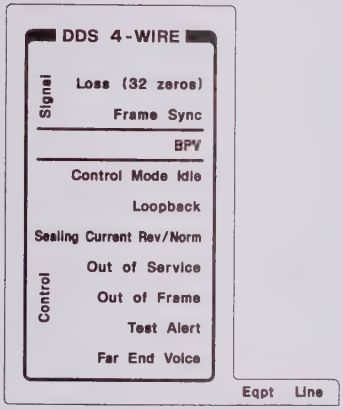
E1 LEDs are provided for both the Line and Equipment sides of the test connection.



Loss - shows red if signal loss has occurred (175 consecutive zeros), and green when usable signal is present.
Frame Sync - shows green when frame synchronization is maintained, dark if it is not.
HDB3 Detect - shows green if HDB3 occurs, dark otherwise.
Line Code Violation - shows red when a Line Code Violation has occurred, dark otherwise.
CRC-4 - shows red when a Cyclic Redundancy Check error occurs, dark when no error detected.
Frame Align Signal - shows red when a Frame Alignment Signal is detected, dark otherwise.
Remote - shows red if a Remote Alarm occurs, dark otherwise.
AIS/All 1's - shows red when an Alarm Indication Signal is detected on the line, dark otherwise.

DDS 4-Wire LEDs

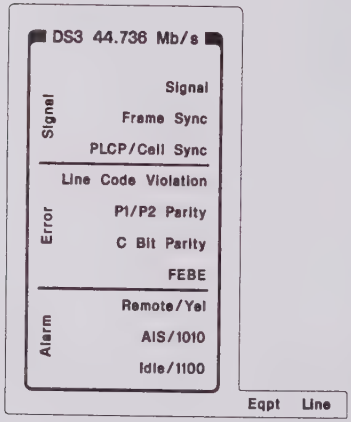
DDS 4-wire LEDs are provided for both the Line and Equipment sides of the test connection.



Loss (32 zeros) - shows green if signal is present, red when no signal (32 consecutive zeros).
Frame Sync - shows green when frame synchronization is maintain, dark otherwise.
BPV - shows green when BPVs are detected, dark otherwise. .
Control Mode Idle - shows red when the DDS circuit is in a Control Mode Idle state, dark otherwise.
Loopback - shows green if a Loopback signal is detected, dark otherwise.
Sealing Current Rev/Norm - shows green on the Line side and dark on the Equipment side when a normal sealing current is detected. It shows Red on the Equipment side and dark on the Line side when a reversed sealing current is detected. A reversed sealing current is generated from the Line side of the network (CO) to initiate Equipment side loop back mode. Note: the Internet Advisor does not respond to DDS reversed sealing current.
Out of Service - shows red if no framing patterns or user data are detected (the circuit is out of service); dark otherwise.
Out of Frame - shows red if the incoming signal is unframed; dark otherwise.
Test Alert - shows red if the CO has signaled that it will begin testing the circuit; dark otherwise.
Far End Voice - shows red when the far end circuit is a voice circuit; dark otherwise.

DS3 (T3)

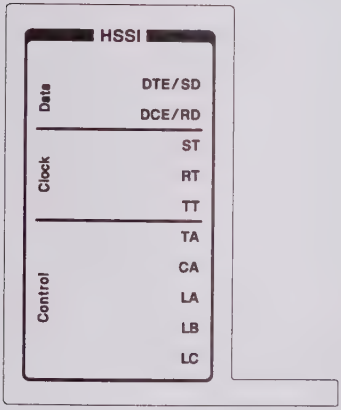
DS3 LEDs are provided for both the Line and Equipment sides of the test connection.



Signal - shows green if signal is detected, red if no signal detected.
Frame Sync - shows green if frame synchronization is maintain; dark/red otherwise.
PLCP/Cell Sync - not used for frame-based WAN applications.
Line Code Violation - shows red if a Line Code Violation is detected; dark/green otherwise.
P1/P2 Parity - shows red when P1 or P2 parity errors are detected; dark/green otherwise.
C Bit Parity - shows red when C-bit parity errors are detected; dark/green otherwise.
FEBE - shows red when a Far End Block Error is detected; dark/green otherwise.
Remote/Yel - shows red when a Remote or Yellow alarm is detected; dark/green otherwise.
AIS/1010 - shows red when an Alarm Indication Signal is detected; dark/green otherwise.
Idle/1100 - shows red when an idle condition exists on the line; dark/green otherwise.

High Speed Serial Interface (HSSI) LEDs

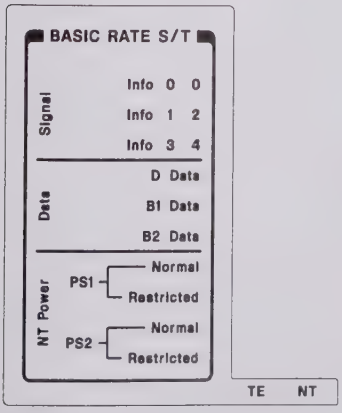
These LEDs show Space/On and Mark/Off conditions for HSSI leads. If both LEDs are lit, the lead is toggling between the two states. If the LEDs are dark, there is no signal present.



DTE/SD - Send Data.
DCE/RD - Receive Data.
ST - Send Timing.
RT - Receive Timing.
TT - Terminal Timing.
TA - data Terminal equipment Available
CA - data Communications equipment Available
LA - Loopback circuit A
LB - Loopback circuit B
LC - Loopback circuit C

ISDN BRI S/T LEDs

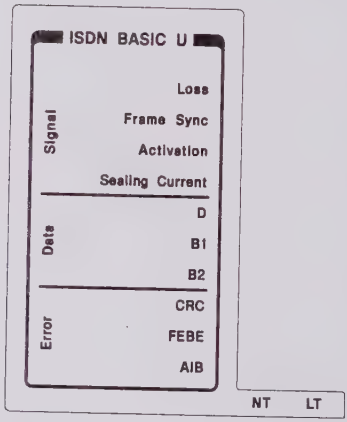
ISDN Basic Rate Interface S/T LEDs are provided for both the TE and NT sides of the test connection.



Info 0 0 / 1 2 / 3 4 - shows green if the specified Info State has been reach; dark otherwise.
D/B1/B2 Data - shows green is data is detected on the specified channel.
PS1/PS2 - shows green if the power level for the specified source is adequate. Normal or Restricted power is also indicated.

ISDN BRI U LEDs

ISDN BRI U LEDs are provided for both the NT and LT sides of the test connection.



Loss - shows green if signal is present; red if no usable signal can be detected.
Frame Sync - shows green if frame synchronization is maintained; dark otherwise.
Activation - shows green when the physical layer for all connected devices has been 'activated'.
Sealing Current - shows green if a Sealing Current is present; dark otherwise.
D/B1/B2 - shows green if data is detected on the specified channel.
CRC - shows red when a Cyclic Redundancy Check error is detected; dark otherwise.
FEBE - shows red when a Far End Block Error is detected; dark otherwise.
AIB - shows red if an Alarm Indication Bit indicates circuit failure or other error condition; dark otherwise.

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